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Continuing Education

Editor's Note The following ten articles were invited by the Editor to promote a better understanding of continuing education as a part of the responsibility of pharmaceutical education.

POSTGRADUATE EDUCATION

ROY A. BOWERS

The principles and practices of teaching and learning have, from the earliest times, been largely associated with the young. For generations the prime objective of our educational system, from kindergarten to college, has been to formalize and perfect the process of educating youth for happier and more productive living. But today, this objective has been broadened to include those who have finished their formal schooling and who are busily engaged in their chosen vocations. This new challenge in education has been given many descriptive titles (1). Perhaps the most widely used designations are "Adult Education," "Extension Work," and "Continuation Studies."

This comparatively new field of learning and teaching is not wholly modeled after experience gained in the development of education for youth. Paul L. Essert (2) and James A. Kearns (3) have defined two broad types of adult learning which are neither separate nor in conflict with one another. One is learning from consciously planned, purposely organized procedures consisting of individual home-study plans and classes, forums, and other group-study situations. The other is the learning which all adults do in day-to-day experience. The two in combination have given a depth of meaning and direction to the development of many types of adult programs of planned learning.

EXPERIENCE VOLUNTARY IN NATURE

This is what is new in the modern world of education: an experience of maturing voluntarily selected by people whose major occupation is no longer that of going to school or college—an experience in which individuals or groups initiate meaningful tasks and apply sustained inquiry to them.

It might be well to point out that no less emphasis is given to the teaching of youth and the engagement of faculties in scholarly pursuits when the doors of teaching institutions are opened to the adult population. These will always continue to be the primary functions of colleges and universities. Rather, something new has been added to the services offered. No longer are college campuses solely inhabited by young people, faculty, staff, and occasional visiting groups. In addition, college teachers can be found conducting classes off-campus in widely scattered places convenient to local groups. University centers are often being established far distant from the town or community with which the institution has been identified. Indeed, buildings especially designed for adult education are becoming more numerous, both on- and off-

campus. College facilities are frequently more crowded in late afternoon and evening hours and in the summer months than they are in traditional school periods. All of this means that universities have become educational centers for the total citizenry, regardless of age group.

THREE MAJOR DIVISIONS EMPHASIZED

In adult education, there have come into being three major divisions of emphasis: (a) refresher or continuation studies in the vocations, i.e., occupational development, (b) organized curricular studies leading toward degrees, and (c) avocational studies leading to a better understanding and appreciation of life processes. Although an individual adult may be motivated by any one of these, both Essert and Kearns conclude that regardless of his initial reasons for pursuing the studies, he is actually trying to bring an interplay of several personal needs and objectives into a state of self-improvement. These desires include occupational achievement, understanding of truths, self-government, close fellowship, and intermittent solitude. In general, most adults seek all of these experiences accenting one or the other at different times in their learning. They are misled if they conclude that any one, taken singly, is the exclusive road to success in improving their status. They are further misled if they believe their objectives can be achieved in a limited time because learning is a never-ending process, especially in the area of occupational improvement where new developments are constantly occurring.

Pharmaceutical postgraduate studies should be geared to the motivation of the practicing pharmacist who wants to do his daily work more effectively and to maintain the respect of his fellow pharmacists and allied professionals as well as all others in his community. Moreover, he must have an understanding of the day-to-day functions of his job. Too often the goals of greater occupational achievement are obscured and difficult to realize because of a failure on the part of individuals to concern themselves with more than the immediate responsibilities of their chosen specialty. This, in effect, serves to exclude consideration of the creative element in the vocations or professions. It involves more than attaining competence in a given technique. While a qualified practitioner must be capable of doing his job well, he must also achieve the satisfaction that comes from doing any task well. Pharmacy like other professions is not merely a "bag of tricks" to be learned by rote. It cannot be carried on without a depth of understanding and appreciation of its underlying fundamentals and principles.

DESIRE TO UNDERSTAND A KEY POINT

A significant difference of attitude between youngsters in school and adults is that adults want to understand what they learn rather than just memorize material for grades. Adults want to learn truths of life that are based upon fact rather than prejudice or propaganda. Adults are anxious to share experiences with others, and, consequently, wish some voice in the selection, organization, and composition of what they study.

From the foregoing, it can be readily appreciated that continuation studies are based upon concepts which are significantly different from those of the traditional educational programs designed for youth.

Progress in the development, enlargement, and perfection of postgraduate occupational studies has not kept pace with the rapid and revolutionary

changes taking place in the practice of professions. As a result, practitioners are unable to keep abreast of the times without continuing study along guided lines. The need is self-evident, and educators must exert greater leadership to meet the ever-increasing demands of those engaged in professional practice. Admittedly, there are roadblocks in the path of such progress (4). But educators themselves are partly to blame for this lag. Not only have existing programs been frequently organized and taught with youth in mind rather than adults, but also a certain amount of inertia and lack of interest on the part of faculty members is still all too prevalent. Apparently many modern educators hold to the same views as their predecessors of the early 1900's when extension work had its beginnings. It might appear that university extension was something which the university or college invented and fostered. But this was not the case. It was not the university which was responsible for conceiving and establishing extension work; it was the citizenry. In fact, there were many on the staffs of universities who were opposed to such activities. The college educator of 1900 was a person who was used to conservative and rigid requirements—requirements geared to recent high school graduates, those young and limited in experience. However, as the demands of the adult population became more insistent, universities were forced to establish programs for them. In the meantime, other groups have risen to the need. Many are unqualified and have little or no knowledge of teaching or the basic college studies previously undertaken by the students.

RESPONSIBILITY RESTS WITH COLLEGES

It is evident, however, that the responsibility for leadership in promoting and developing postgraduate education for the professions rests with professional schools and colleges. Now that these institutions are increasingly being called upon to provide continuation studies for their former students, modern educators cannot afford to repeat the trials and errors of the past. Pharmaceutical educators have recognized the importance of this phase of educational service as is evident from the number of colleges of pharmacy now offering such programs for practicing pharmacists. Dean Lloyd M. Parks (5) of Ohio State University made the observation recently that little time need be spent in establishing and justifying the need for continuing professional education in pharmacy. He noted that the latest National Association of Boards of Pharmacy census figures show that 34 per cent of the pharmacists in this country have had the benefit of something less than a four year college course, including almost 13 per cent who have had no formal academic training. This, together with the fact that new drug products currently are appearing at the rate of 400 to 500 per year and the mass of new information which must be absorbed by the practitioner, would seem to be sufficient justification for a furtherance of continuation study objectives. He held that there should be little argument with the view that the responsibility to provide this type of continuing education rests on our colleges of pharmacy, particularly those colleges in our state-supported universities.

The American Association of Colleges of Pharmacy has maintained a long and abiding interest in continuation studies (6). The current special Committee has advocated (7) obtaining a sizable grant from an appropriate foundation for a comprehensive study whose object would be to furnish

colleges with assistance in developing programs. While the studies of the Association's committees have been helpful to member colleges, it was felt that the urgency of the need and the magnitude of the task required much more effort than could be reasonably expected of an ordinary committee (8).

COOPERATION WITH PRACTITIONERS NECESSARY

While leadership and inspiration should and must come from the colleges, the development of programs should be carried on in full cooperation with those for whom they are intended. Unlike a class of students enrolled in a well-organized college curriculum, who are a relatively homogeneous group, pharmacists are of all age groups and of varying educational backgrounds and experiences. Some have retained a good or fair grasp of the pharmaceutical studies while others may have a poor or superficial understanding of basic pharmacy, chemistry, biological sciences, and pharmacy administration. Attendance and participation is voluntary, and inasmuch as poor attendance is the most discouraging and frustrating element in developing these activities particular stress must be placed upon motivating pharmacists to make the necessary sacrifices to participate regularly.

The effort required on the part of faculty members to stimulate attendance oftentimes appears out of proportion to the apparent results. But this should not dull their enthusiasm to continue. Nothing less than the welfare of the profession and the health of the public is involved. Frustration and discouragement are not new to the educator, particularly in the realm of public health. Many of our life-saving remedial agents and techniques in common use today were vigorously opposed when first introduced. And were it not for the heroic crusading of public health educators, the losses to human welfare would be incalculable. If we agree that education is a continuing process, the efforts of educators must be equally continuous.

Extension work is of as much benefit to the college and to the profession as it is to the pharmacists who receive the training. Parks pointed out that this type of service affords the college of pharmacy opportunities to promote good will and support for itself among practicing pharmacists, and to improve public relations for the profession.

RETAIL PHARMACY IS A LABORATORY

The retail pharmacy may be considered the laboratory of pharmacy administration where there are ample subjects and opportunities for research in a dynamic environment. Participation by college faculty members in professional postgraduate studies brings them into close contact with the pharmacy practitioner in an atmosphere conducive to a mature analysis of existing problems and needs in the field. The results of this analysis can, in turn, be transmitted back to the practicing pharmacists with benefit to everyone concerned. Teachers in all pharmacy disciplines may benefit equally through such contacts.

It should be noted that many pharmacists' preliminary interest in continuation studies will be associated with those areas related to economic improvements. Advantage should be taken of this all-important motivating force in stimulating pharmacists to the broader objectives of the program. These are concerned with the upgrading of the professional and scientific services of the pharmacist as well as with improving his business status.

FINANCING THE PROGRAM

The financial aspects of in-service training present a difficult problem for most, if not all, colleges. The question is whether the programs should be completely self-sustaining or be supported by the university or college under the same budgetary considerations given to resident instruction. Or, should the institution underwrite the program and recover all or most of the costs through registration fees and contributions from state or local pharmacy societies, pharmaceutical manufacturers and wholesalers, and other interested groups? From the point of view of the administration of land-grant universities, it is inevitable that pharmacy be compared to agriculture with respect to financial support from governmental sources. However, federal and state funds similar to those which support agricultural extension are not presently available for pharmacy. Pharmacy does not qualify under the federal Smith-Lever Act of 1914 and subsequent acts upon which the whole system of agricultural cooperative extension has been built (9). Nor are colleges of pharmacy eligible to participate in either Smith-Hughes or George-Barden Funds because the funds may be used only in education which is "of less than college grade." (10) However, there is one phase in which colleges of pharmacy can conceivably participate, and that is in distributive education (11). The purpose of distributive education is to improve the competence of workers engaged in distributing the products of farm and industry—retailers, wholesalers, jobbers, and others in selling services. Although, as previously stated, selling and merchandising are important areas in pharmacy extension work, colleges should be aware that funds derived from governmental sources under the aforementioned statutes preclude the introduction of professional courses. And these limitations are obviously not desirable.

The matter of federal support is, however, not a closed question. Several groups, including the National University Extension Association, have sponsored legislation in Congress to extend the provisions of the Smith-Lever and Smith-Hughes Acts to include all professional and vocational fields. The NUEA continues to press for federally aided programs for labor and individuals and groups, including industry, commerce, the professions and the subprofessions, not now served. Such educational programs would include either full-time or part-time formal classes carried on for nonresident students, correspondence courses, and various informal methods or techniques. The latter could include institutes, lectures, forums, conferences, short courses or demonstrations, and the use of mass media such as television, radio, educational films, and printed material, irrespective of whether credit is given.

The facts and opinions contained in this paper indicate that the question before colleges of pharmacy is not whether they should institute or expand their professional continuation study programs, but rather, when and how soon this can be accomplished.

The pharmaceutical field is growing in complexity, and with this growth comes additional responsibilities for both the practitioners and for those who wish to guide them properly.

The responsibilities of pharmacy educators in providing this guidance are apparent to everyone. Financial or personnel limitations may restrict the scope of initial efforts. But every attempt should be made to institute such programs regardless of how modest preliminary objectives may be.

Other contributors in this feature section devoted to postgraduate education will spell out in more specific terms various methods which can be adopted by colleges of pharmacy interested in assuming their responsibilities to the field. A study of these articles will provide an excellent blueprint for action.

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(10) *Ibid.*, 733.
(11) *Ibid.*, 729.

It can be said that the American colleges of pharmacy have understood and answered the challenge of . . . development even better and more profoundly than most of the European pharmaceutical institutions of learning. There in many cases the traditional curriculum of twenty years ago has been retained or only slightly changed. Here since about the same time the educational program has been in the stage of incessant change and reconstruction following whatever necessity arose.

George Urdang, Am. J. Pharm. Ed., 6, 59 (1942)

PHARMACY AND CONTINUING EDUCATION

HUGH B. MASTERS AND JOHN B. BENSON

The rapidity of change in our times has outmoded the idea that education is a preparation for life intended exclusively for the young; the adult needs to continue the educative process throughout his life. Not only for the sake of the individual is this necessary, but for the sake of the nation as well. An informed and thinking citizenry is essential to the development and survival of the democratic form of government.

The concept of Continuing Education shares with the society which supports it a belief in the basic principles of democracy. Among these are a belief in the dignity and worth of the individual; the basic rights and freedoms incorporated in the Bill of Rights; and, in particular, the freedom of the individual to inquire into the nature of all things so that he may achieve for himself in relation to his abilities. Cultural and economic patterns develop and change through the long and tedious experiences of the people. But men who are free to seek knowledge and understanding recognize change not as a threat, but as a natural phenomenon to be understood and adapted to.

And so it is in the profession of pharmacy as it is in any profession, or in life itself. Changing patterns of distribution, changing habits of consumers, and, foremost of all, changing medicants and pharmaceutical supplies demand continuing study and knowledge. The strategic importance of continuing study is underscored by the fact that the adult is in a position to put the results of his learning into practice immediately. Through adult learning we reduce the time lag between the development of new and better ways of living and doing and their actual use in everyday living. Thus it is that adult learning is the quickest and surest way to a better state, a better region, and a better professional status.

It is probably true that the twentieth century has experienced greater change than any century which has preceded it. It is of the nature of the times that we are witnessing astounding changes in population growth, mobility, and age. In the brief span of 100 years the life expectancy of Americans has doubled. The net result has been that our population has quadrupled, that greater and greater numbers of us are living to respectable old age, and that in all probability our population will double or triple or quadruple again in another hundred years.

It would be difficult to deny that our changing population hasn't had direct effects on the pharmaceutical profession. Primarily it has posed the problem of finding some means of helping pharmacists to keep up with the changes in their profession, and to enable them to deliver more services. But the other changes, the changes in distribution and prescription, also demand constant attention by the pharmacist if he is to serve his community efficiently and well. The problems created by change must be met and planned for.

The function of continuing education is to bring together (1) the people, their problems, and their needs; (2) the resources which will help them meet these needs; and (3) the learning situation which will stimulate their initiative and their imagination so that they can help themselves. Important to the success of continuing education are the courses and programs, the devices of communications, and the physical surroundings of the conferees. The adult educator advocates varied and flexible programs of an informal nature. Their content and method are determined by the nature of the problem, the

resources available, and the information and skills of the people concerned.

The programs are carefully organized, with the participating individuals helping to determine their nature and content. The atmosphere at a conference is relaxed and informal. The participants are not told what to think, but to explore problems for themselves through the sharing of information and ideas.

Each conference and short course involves three phases: (1) preconference preparation through home-study materials; (2) the conference itself; (3) post-conference study through published materials and through appropriate home-study courses, television, radio programs, and films. The follow-up includes careful evaluation of a conference for the purpose of planning and improving future conferences.

New communication devices are valuable tools in modern adult education. By the intelligent use of modern technological devices such as television, the motion picture, charts and graphs, and other aural and visual communication tools, adult education can be made more effective. A rewarding conference contains some of the elements of good theatrical production: conflict, focus on the right thing at the right time, climax, elimination of the nonessential, and proper sound, staging and lighting.

These are tested methods of the adult educator and would have a direct application to the problems of the pharmacist. The short course and conference idea has enabled many professionals to achieve greater efficiency and knowledge in their professions.

It is recognized that many pharmacists, especially those in small, independent pharmacies, would have difficulties in leaving their business for a period of more than a few days. And for them a plan of instruction must be developed that would enable them to receive instruction more conveniently than at an adult education center. But many educational methods are available. Home study—or correspondence courses—is an effective instrument for obtaining certain basic information. Also tapes, films, and television could be employed for community groups which could study with the leadership of university faculty. But whatever method is chosen, it needs to be systematic and continuing.

It is not possible to live as a specialist alone. Every man lives in a world peopled with others of differing ideals and motives. Differences create conflict, sometimes healthy, and sometimes not. It is the responsibility of all of us as citizens of our communities to understand as best we can the community in which we live, and to help create through our efforts the better community in which we would like to live. To be an effective pharmacist as well as citizen, the pharmacist needs to know the functions of his government and his responsibilities to it. For instance, to better understand his choice of a business site, the pharmacist should know his local zoning laws, not just from the point of view of commercial value, but from the view of community betterment and planning.

A person's citizenship extends beyond his own property to his schools, his roads, his church, his state and country. None of us live completely independent and separate, but as part of a society which we each individually help to direct and create. Thus it is that one of the purposes of any continuing education program ought to be that of helping the participant find himself in the total context of his living as well as in the particular professional group which is his.

PHARMACEUTICAL EXTENSION SERVICE

JOHN L. VOIGT

The *Findings and Recommendations of the Pharmaceutical Survey* (1948) refer to adult education pertaining to pharmacy as "In-Service Training for Pharmacists" which may be considered specialized adult education. The survey recognized the importance of vocational training covered by the George-Deen Act but felt that other provisions should be made for an effective form of adult instruction which would enable the practicing pharmacist to keep abreast of modern pharmaceutical progress and advances in a "systematic and continuous manner, properly organized and digested." The recommendations of the survey are as follows:

> 1. It is recommended that each of the accredited colleges and schools of pharmacy recognize and assume responsibility for providing organized programs of in-service professional instruction of the practicing pharmacists within the area normally served by the institution, and to this end set up, under competent, professional direction, an operation unit to be known as the "division of pharmaceutical extension."
>
> 2. It is recommended that the duties of such division of pharmaceutical extension include the development of refresher courses conducted at the institution, programs of reading, correspondence study courses, and the systematic visitation and personal counseling of pharmacists.
>
> 3. It is recommended, in order to insure the maximum of cooperative effort, that the state boards of pharmacy of each state take the initiative for the creation in the state of a Pharmaceutical Extension Council consisting of the dean of the college(s) or school(s) of pharmacy, the director(s) of the division(s) of pharmaceutical extension, and representatives of the state pharmaceutical association and the state department of public instruction.

There can be no doubt that the problems of overcrowded schools, new physical facilities needed for normal progress, and inflationary economic conditions have curtailed and prevented the majority of pharmacy colleges from setting up a "Division of Pharmaceutical Extension." However, many of the colleges of pharmacy are conducting refresher courses and seminars with the cooperation of their university extension divisions.

The Pharmaceutical Extension Service at Rutgers was established in 1950. Its objectives were to carry out the recommendations of the survey in all ways that would be possible and practical.

The annual budget provides for a Director of Pharmaceutical Extension Service whose functions are patterned after the county agent office of the Agricultural Extension Service. This service is available to all pharmacists in the state, and they need only call or write to the office of the Director who will schedule a visit to the pharmacist in "his own backyard." This personal consultation may involve any problem including professional or economic discussions. One of the most common economic areas involves "picking or evaluating" a new or old location. Once a pharmacy location has been picked or established, the pharmacist may ask and receive advice on budgeting, inventory control, departmentalizing, and any or all phases of the physical layout.

Over 50 per cent of the Director's time is spent in the field visiting pharmacies. His function is similar to that of a salesman, informing the pharmacists about the extension services that are available to him. It is on these visits that future appointments for consultation are made. It is also apparent that these visits make the pharmacist aware that we at the College

of Pharmacy are sincerely desirous of helping him. After having visited a pharmacy for the first or second time, a follow-up letter is always sent to the pharmacist emphasizing our desire to cooperate and help him on any pharmaceutical problem that he may have.

With the College of Pharmacy located in a metropolitan area, we are constantly being forwarded foreign prescriptions for translation and determining source, availability, or American equivalent products.

Other activities established and conducted by the Extension Service include the *Rutgers Pharmacy Extension Newsletter*. This publication is mailed to all pharmacies in the state. Annual refresher and seminar programs are also planned and presented in cooperation with local, county, and national pharmaceutical societies.

The annual Rutgers Pharmaceutical Conference was founded in 1952. This conference acts as a sounding board for the pharmaceutical profession bringing together speakers from all segments of pharmacy such as, the practicing pharmacists, wholesalers, manufacturers, hospital pharmacists, educators, publishers, and many other facets of pharmacy.

Pharmaceutical extension courses which have enjoyed significant popularity are pharmacology and microbiology. These are noncredit extension courses which convene once a week for sixteen weeks. These courses have been made available also to those in the manufacturing industry. A more specialized course that has enjoyed support from both practicing pharmacists and those in the industry is a course in marketing and development of drugs.

The Director acts as student advisor for the Student Branch of the American Pharmaceutical Association and aids the students in planning their activities during the year.

Annually, during the spring, the extension service becomes a placement agency for graduating students who are placed as internes in pharmacies cooperating with the Board of Pharmacy. The culmination of this activity resolves itself into a placement bureau for newly registered pharmacists after their internship.

The preceding has been a review of the activities and progress made in fulfilling the recommendations of the Pharmaceutical Survey.

A German decree of 1573 states that pharmacy clerks should not be "idiots," and must be sufficiently learned not only to know Latin words but to understand every physician's intention expressed in a prescription.

George Urdang, Am. J. Pharm. Ed., 6, 55 (1942)

THE PHARMACEUTICAL CARAVAN: A MEANS OF POSTGRADUATE EDUCATION*

EDWARD S. BRADY

The problem of continuing the education of the pharmacist throughout his professional career has been a perennial topic for discussion at the local, district, and national association levels. Most schools of pharmacy have periodically offered "seminars," "refreshers," or "conferences" on their campuses, thus ostensibly fulfilling this obligation to the practicing pharmacist, and it is this type of program which is most frequently discussed and recommended at our conventions and district meetings. However, a realistic appraisal of such programs reveals that they leave much to be desired in attendance, material presented and understood, and opportunities for contact and discussion between the faculty and the pharmacists who participate. We at the University of Southern California School of Pharmacy were dissatisfied with our annual on-campus seminar program, and early in 1954 we undertook a more objective plan of postgraduate education. Our efforts were encouraged by our alumni throughout the state, and the realization of this educational plan was made one of the objectives of our Fiftieth Anniversary Alumni Development Campaign. During this drive, financial support for the program was obtained from a local pharmaceutical manufacturing concern, Boyle and Company, through their president, Mr. Harlow Boyle, who pledged $1,000 annually to defray the expenses of our revitalized seminar program.

Early in our planning, definite basic principles emerged from joint meetings of faculty and alumni steering committees. While these principles were never formalized by written statement, they embraced the following ideas:

1. Take the program to the pharmacist.
2. Give the programs free of charge.
3. Present professional topics.
4. Present the lectures in an understandable way.
5. Use the regular pharmacy faculty only, and pay them for their services.
6. Let the area alumni make the arrangements, but invite all pharmaceutical groups to participate.

A very successful seminar program has been developed from these plans. Briefly stated, in less than five years we have presented thirty-eight seminars in twenty-one different cities. These have involved about 150 separate meetings and nearly 200 lectures by staff members, and have been attended by approximately 6,000 pharmacists. This seems to us to be a successful approach to the problem of postgraduate education, and this outline of our experiences is offered as a means of encouraging other schools of pharmacy to expand their training programs for the practicing pharmacist.

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Time and Place of Meeting. Initially, the presentation of the seminars was planned for those cities in which our overtures to a few alumni were encouragingly received. When these meetings proved successful, the news spread quickly, and requests for our services came from many California areas. At the present time, arrangements are made in the order in which they are received, with some preference being given to those areas in which a seminar has previously been outstandingly successful. Also, since early 1955, the University as a whole has organized a "Trojan Caravan" to bring the seventy-fifth anniversary of its founding to the attention of the Southwest. Under this plan, representatives from the many divisions of the University travel as a group to the chosen city, and for more than a week appear as speakers before civic and fraternal groups, high school and junior college assemblies, and on radio and television in the district. An alumni banquet closes the affair, and by the time the "Caravan" has folded its tents and departed, that particular city has been made acutely aware of the educational and cultural facilities of the University of Southern California. Our own program is often made a part of this greater caravan, and the pharmacy seminar is offered at a time which coincides with the all-University visitation. This arrangement has proved to be of mutual benefit, since we add to the caravan in program and staff, and elicit the especial attention of the pharmacists, while additional publicity and prestige is brought to the pharmacy seminar, and arrangements are often made to have our faculty participate in the service club and school speaking engagements during the week. We like to think that it was the success of the pharmaceutical caravan which encouraged the University as a whole to undertake its more elaborate venture. The importance of the first principle given above, "Take the program to the pharmacist," cannot be overemphasized. In towns which might be considered to be within easy driving distance of the campus, or within a few minutes of each other by car, large audiences of pharmacists who had never attended an on-campus seminar were gathered. It would seem that a matter of fourteen to twenty-five miles in thickly populated areas is sufficient distance to discourage attendance, and whether it is local pride, or dislike of driving, pharmacists prefer to support an activity which takes place in their immediate area. Even areas far distant from the campus have responded enthusiastically to our seminar plan. It has been most heartening to be asked back to the cities of San Francisco, Phoenix, Reno, and Las Vegas for annual or biennial meetings, and when two of our speakers were flown to Honolulu by the Hawaiian Pharmaceutical Association for a six-day seminar for the pharmacists and doctors of the island, we were certain that our efforts had been recognized beyond our expectation.

The Program. Our seminar programs are presented in two general formats; one is an all-day meeting with four or five lectures and a luncheon with speaker, while the second type presents one lecture one evening each week for from four to eight weeks. The all-day meeting is used principally in those cities more distant from the campus, where the advantage of traveling together may be enjoyed by some of the group. Such a program offers no real advantage over any other full-day professional meeting, except that by taking our seminar to the pharmacist in his own area, more pharmacists are reached. The fourteen one-day programs presented thus far have been attended by some 600 pharmacists. Under our former plan of once-a-year on-campus seminars, only a fraction of this number would have attended, and few par-

ticipants could have come from the more distant areas to which the caravan has traveled. These one-day meetings are sometimes planned to coincide with other events which might attract our alumni to the seminar city; thus, the San Francisco seminar has always been held the Sunday following SC's "big game" with Stanford or California in the Bay Area. Our alumni from northern and central California are thus encouraged to make one week-end trip suffice for both events, and some attend who could probably not otherwise justify the journey.

Whenever possible, we prefer to schedule our program with a single speaker each week for a period of from four to eight weeks. Twenty-two seminars of this type have been presented, with an average of six meetings per series. A mutually convenient week-day evening is selected, and the hour arranged to permit attendance after the usual closing time for the pharmacies in the area. We feel that this format permits better attention and retention by the audience, allows more time for discussion, may permit some to hear a portion of the series who might be unable to attend a full-day program, and extends the period of attention and publicity devoted to our appearance in the area.

It has been our experience that the actual programing of topics is better left to the faculty program chairman, without much regard for the suggestions of the participating group. This enables the lecturer to prepare a suitable topic which he may use for a "season" or year, and improve it with each presentation much in the same manner as with a classroom lecture. In general, the pharmacist is not "lectured down" to, but is reviewed on the fundamentals of the subject so that he may understand the balance of the lecture. Mimeographed resumes of each topic are provided those in attendance, and presentations are about one hour long, with a discussion period of fifteen to thirty minutes following. Audio-visual materials are extensively employed. Six faculty members and the Dean have so far provided nearly all of the lectures given, and the subject material has dealt with scientific advances which have practical interest to pharmacists, such as newer hormones, antibiotics, tranquilizing agents, hematopoeitic agents, diuretics, hypotensives, biological products, ointment bases, ophthalmic solutions, etc. The only deviation from this scientific aspect is found in the subject of "Pharmacy Law" and "Prescription Pricing," two fields which are of constant interest to the pharmacist, and in which we have two authoritative speakers. Audience reaction and questions are noted, and lectures improved with each presentation.

Publicity. Seminar attendance is encouraged by all possible avenues of publicity. The area chairman, an alumnus, is chosen for his previous interest in the school and for his influence in pharmacy in the area. It is his duty to choose the place of meeting, arrange for a luncheon if required, and help in local publicity. Mailings are made from our office to alumni in the district to be visited, local association address lists are requested, and local telephone contacts are made if a "captain" plan exists. The wholesalers servicing the stores in the region are provided with programs and invitations to be enclosed in their orders and billings, and the Boyle representative in the area, as well as the other detail men, is asked to spread the news. Finally, news releases are furnished the local papers, and it is indeed an isolated pharmacist who is not aware that the pharmacy seminar program is coming to town. Care is taken to give Boyle and Company proper credit for its support in programs and announcements.

The Budget. The initial yearly grant of $1,000 was used to provide the lecturers with an honorarium and incidental expenses, and to defray the cost of printing and mailing. Incidental expenses for seminars held in the areas near the University are negligible, but for distances which approach 100 to 1,000 miles for the round trip and which require overnight accommodations, expenses of nearly $500 per seminar may be incurred. For this reason, the annual donation by Boyle and Company has been increased to $1,500, and an additional $500 has been made available from the Pharmacy Alumni Association. While it would be possible to reduce expenses somewhat by utilizing the lowest-priced transportation and cheap accommodations, we have felt that, as representatives of the University, the transportation and accommodations of the lecturers should be of the best quality. Thus the faculty participants have come to regard these seminars with pleasure despite the demand which is made upon their time and energy, and they reflect this pleasure and confidence in their lecture presentations and social contacts while on tour.

Results. Our staff and alumni board agree that the pharmaceutical caravan is one of the finest things that the SC School of Pharmacy has ever done. It has fulfilled a need for postgraduate education in a way that no on-campus program could have approached, and it has provided an objective program for local pharmaceutical groups, bringing them purpose, information, and publicity. It has afforded our staff the opportunity of personally contacting many alumni and friends, and has allowed the profession to meet and hear us, and to discuss our mutual objectives. It has improved our relationships with the University administration through our participation in the general "Trojan Caravan" and the evidence of alumni support of our program. And, finally, it has reflected credit on pharmacy as a profession, providing local publicity for the profession, the local associations, the School and the speakers.

It is hoped that those educators who are not satisfied with their present plan of postgraduate education will consider the advantages to be gained by taking their seminar program to the pharmacist. The rewards to be found in increased public and professional prestige, improved relations with the members of the profession, and the satisfaction of presenting useful information to an appreciative audience far outweigh the effort expended. Certainly our plans for the future will inevitably include the continuation of our own "Pharmaceutical Caravan."

There was for a long time in the entire western world only one educational prerequisite for entrance into pharmacy: a satisfactory knowledge of Latin.

George Urdang, Am. J. Pharm. Ed., 6, 55 (1942)

ANNUAL PHARMACY LECTURES—UNIVERSITY OF MICHIGAN

TOM D. ROWE

The Annual Pharmacy Lectures at the University of Michigan, a one-day program, consist of five talks and a banquet speaker. In general, these lectures are similar to the one-day "refresher" or "seminar" programs given at other colleges of pharmacy. There are possibly a few distinguishing features of our program which help to make it successful. Probably the most important of these is the level of presentation which we attempt to attain. We try to have all of our papers presented on a level that assumes the pharmacist is a well-trained scientist who can and does understand modern scientific methods and terminology. In other words, we make sure that our speakers do not talk down to the pharmacists. We are not always 100 per cent effective in reaching this goal, but have been successful in most instances. Pharmacists from other sections of the country who have attended our lectures have always commented on the quality of our papers and the high level at which the entire program is pitched.

Another point which we stress each year is the over-all pattern of the program. We have a few guiding rules which we try to follow in arranging for the papers to be presented. On the positive side we have three principles as follows: (1) There shall be at least two, and possibly three, medical speakers. These individuals will either be practicing physicians who are also engaged in research, or they will be scientists closely associated with medical practice and clinical research. (2) There shall be one retail pharmacist who can discuss some phase of pharmacy with which he is especially well informed because of his own experience. (3) There shall be one of our own pharmacy faculty members.

On the negative side we have two guiding principles: (1) Commercial pharmacy is to be kept at a minimum. Not more than one paper is delivered at each lecture. (2) No speakers will be obtained from pharmaceutical manufacturing houses.

No doubt some of these principles might, without knowing our reasons for using them, seem rather unsound or unnecessary. Consequently, I should like to comment on each of them.

1. The extensive use of medical men.

This principle is one which developed over the years. We have always had some medical speakers on the program and have found the practicing pharmacists are more interested in their papers than any others. These speakers always bring to our group the latest developments in their fields and always work the retail pharmacists into the picture. The medical men we have selected have, without exception, been outstanding speakers and have held the complete interest of the audience. A number of speakers in this area have been so good that pharmacists still talk about them four or five years after the talks have been presented. We are fortunate in having available to us the personnel of the University of Michigan Medical Center, including the Medical School, the various research units, the hospital, the School of Public Health, and others. We have, therefore, a wide selection of individuals from which to choose, and we generally know the ability of the individuals we select. We are also able to tell them the type of talk we want.

2. Use of practicing pharmacists.

We believe a program of this type should have a practicing pharmacist on it because, after all, the program is directed towards this group. We believe there are enough practicing pharmacists who have ideas on operations which are of interest and value to other retail pharmacists. We hope their presentation may stimulate some other pharmacists to do a better job or to develop some special operation which will help raise the general level of practice. The big problem in selecting these speakers is to find those who are better-than-average public speakers. We have had some excellent talks by practicing pharmacists, but we have had some that have been complete failures. This area is one which requires great care and considerable work in selecting the speaker.

3. Use of pharmacy faculty members.

The reasoning here is much the same as given for number two above. After all, our faculty members are teaching the retail pharmacists of the future. They should, therefore, be able to present interesting and useful information to the pharmacists. We try to select ideas that the pharmacists can put to use in their stores, either for more effective business or professional operations. While the faculty members always do good jobs, we have found lack of interest by the majority of the audience on new compounding and dispensing techniques and related ideas. For example, a few years ago one of our professors gave an excellent presentation on the compounding of ophthalmic preparations. He also introduced some new equipment suitable for use in a well-run prescription department. This paper, unfortunately, was not well received, and little interest was shown. This experience and others similar to it have led us to select with great care the topics to be discussed by faculty members.

The two principles listed as negative approaches need clarification, too.

1. Commercial papers kept to a minimum.

In our state, as in most of the others, the twenty-odd county and district associations devote most of their meetings to presentations by commercial speakers. The wholesale druggists show films accompanied by talks on store departmentalization, store management, and similar aspects of store operations. Consequently, we feel this aspect of pharmacy is covered quite extensively each year. We do not want to have our meeting be a duplication or extension of the monthly county association meetings. Therefore, unless we have some unusual or new aspect to be presented, we play down this phase of pharmacy. This does not mean we do not consider it important.

2. Restricted use of speakers from pharmaceutical manufacturers.

We recognize that pharmaceutical industry has many excellent speakers available. However, our state convention and frequently the county meetings have some of these individuals on their programs. Again, as with commercial papers, we do not want to have the same type of program as presented elsewhere. We believe we can obtain equally good speakers from other sources and, thus, bring a fresh and different approach to some of the topics discussed.

There are a few other points covering our lectures which may be helpful to other schools presenting similar programs.

1. Planning the program.

Our lectures are given late in October each year. This means planning must begin the previous spring in order to have everything ready for notices to be sent out in September. We have a meeting in April of our Program Committee. This Committee consists of representatives from the Michigan Branch of the American Pharmaceutical Association, which co-sponsors the lectures with us. We also have representatives from the state association, the county group in which we are located, and from the pharmacy faculty. Prior to this meeting, a faculty committee has worked on possible topics which are presented to the larger group. In the larger group, representatives from all branches of pharmacy are represented. By this means we can try to devise a program of interest to all segments of pharmacy. I am pleased to state that the retail pharmacists come up with many good suggestions at these meetings. If at all possible, we include their ideas in the final program.

2. Publicity.

Like most other "refresher" programs, we are interested in having as many pharmacists as possible attend, and, we hope, benefit from our lectures. Consequently, we make considerable effort to make them aware of our program.

Late in August the completed program, with an accompanying statement about the lectures, is sent to the editor of our state pharmaceutical journal, to the three or four sectional journals serving Michigan and surrounding states, and to three or four national journals. While the Michigan pharmacists will not be reading all of these journals, we expect they will be reading two or three of them, and hope they will notice the announcement of the Annual Pharmacy Lectures.

Late in September we send a letter with a copy of the program enclosed to all of the store owners who hold membership in the Michigan State Pharmaceutical Association. About 2,200 stores are reached by this mailing. The envelopes are addressed in the office of the Secretary of the State Association, using the Association's addressograph plates. At the same time, a separate letter and program are sent to all of our alumni. Also, a letter and program are sent to all members of the Michigan Branch of the American Pharmaceutical Association. Obviously, there is some duplication in this list, and some of our alumni will get all three letters. We feel, however, that the cost of this duplication is less than if we were to go through the various lists and separate the names involved.

At the same time, a letter and program are sent to the secretaries of all the county and regional associations in the state. We ask the secretaries to announce the lectures at their next regular meeting.

A second letter is sent to all of these groups, except the secretaries, about two weeks before the lectures. Enclosed with these letters is a postpaid reservation card.

As a result of these activities, we have a turn-out running from 150 to 200 at each meeting. This number is exclusive of our students and faculty members.

3. Entertainment.

While the papers presented are the most important part of the program, we believe the day should be more than a series of talks. We start the day

with a coffee hour, which runs from 9:00 to 10:30 A.M.—the period set aside for registration. This coffee hour is sponsored by the Washtenaw County Pharmaceutical Association. Ann Arbor is in Washtenaw County. We make this occasion as pleasant as possible and hold it in one of the large lounges adjacent to the room where the lectures are held. Registration, coffee hour, and meeting room are all located in the Rackham Building, an unusually well-appointed building used mainly for conferences of this type.

There is a luncheon at noon in the Women's League Building, which is located within a block of the Rackham Building. There are no speakers or other program at the luncheon.

At the conclusion of the afternoon session and just prior to the banquet, a social hour is held at one of the local country clubs. This part of the program is sponsored by a pharmaceutical manufacturer and two wholesale drug houses.

The concluding affair of the day is the banquet. We always have some musical entertainment of high quality followed by a speaker. The speaker may or may not deal with a pharmacy subject or a closely related one. About half of the time we have a talk on subjects completely removed from pharmacy.

These various social aspects of the program are thoroughly enjoyable. We believe they make more people interested in coming to the lectures than if we had a program of papers only.

4. Miscellaneous.

We are assisted in putting on the lectures by the University Extension Service. This unit helps with our preprogram arrangements and also takes complete charge of registration and reservations. All people who indicate in advance that they are coming are preregistered with name tags typed out in advance. These individuals can then register with very little delay.

We charge $2.50 registration fee in addition to the charge for meals. This fee helps defray the cost of the meeting, which runs well over $1,000. The amount spent will depend on how many speakers are brought in from out-of-state and how far they come from. One of our alumni gives us $250 each year to help defray the cost of travel and expenses for outside speakers. The remaining expenditures, except for the sponsored coffee hour and social hour, come out of our regular operating budget.

While the presentation of these lectures entails considerable planning and effort, we believe the results obtained are worth whatever time is spent. We are fairly well pleased with the attendance, but hope it will increase in future years. We believe the pharmacists benefit from attending the lectures and hope that the lectures are helping, even in a small way, to raise the level of pharmacy practice in our state.

There can be no democracy without peace; there can be no true and lasting peace without justice; there can be no justice without clear thinking, trained historical perspective, and the active controlled intelligence.

Gilbert W. Mead, Am. J. Pharm. Ed., 6, 52 (1942)

CONTINUING EDUCATION IN PHARMACY AT GEORGIA

KENNETH L. WATERS AND CHARLES L. BRAUCHER

The need for an effective program of continuing education for the practicing pharmacist has long been recognized by the University of Georgia. Dr. Robert C. Wilson, former Dean of the School of Pharmacy at Georgia, pointed out the need for pharmacy extension work in an article in the October, 1940, edition of the *American Journal of Pharmaceutical Education*. Dr. Wilson commented, "The solution to this phase of our educational problem lies in the possibility of the development of educational extension services, where, under the direction and auspices of the school or college of pharmacy, the stimulus to intellectual and commercial growth may be carried directly to the individual, to the end that every retail drug store in America may be so physically and spiritually equipped that they will reflect not only a professional spirit but financial and commercial stability as well." (1)

In the spring of 1949 the first pharmacy seminar was held on the University campus. An all-out effort was made to reach the retail pharmacists of the state with the cooperation of the Georgia Pharmaceutical Association. The program lasted two days and was primarily economic in nature.

This program and those that followed required extensive promotion. In order to introduce some variety and at the same time experiment with new approaches, the format was changed from year to year. The length of the seminars ranged from one-half day to two days.

After five years of this type program, an evaluation of the results showed that the seminars were falling short of the goal, namely, a continuing education program designed to reach the wide range of practicing pharmacists who were in attendance each year. This group consisted of two segments: (1) recent graduates who were active while in school and (2) older pharmacists who were active in the state pharmaceutical association. Those individuals who needed most to continue their education were not attracted to the campus even though an intensive publicity campaign was waged.

In 1954, the idea of a traveling seminar was evolved. Since the pharmacists would not come to the campus, the most logical step was to extend the campus to the pharmacists. A three-hour program was built around prescriptions and personnel training. It was presented to local pharmaceutical groups in eight cities for a charge of $100 per presentation. These lectures were illustrated with model prescription-room equipment and drew a larger total attendance than the annual meeting of the state pharmaceutical association. The cost, personnel requirements, and nature of this program did not warrant its being repeated.

The following year another attempt was made to bring pharmacists back to the campus. This seminar met with no greater success than the 1949-53 series.

About this time a campus social attraction was combined with the seminar in the hope of increasing attendance. Thus the former Student-Faculty Day became Student-Faculty-Alumni Day. The seminar portion of this event was scheduled in the morning and afternoon. The evening portion of this program featured an awards banquet which was the major social attraction of the year.

Here again, the previous attendance pattern emerged; i.e., only recent graduates and the most loyal alumni attended. An interesting observation was that attendance at the pharmacy seminar portion of the program was less than the attendance at the pharmacy awards banquet.

In January, 1957, a very valuable asset to the continuing education program of the state of Georgia was the opening of the Kellogg Center for Continuing Education. This multi-million-dollar plant includes excellent hotel facilities for 300 people, conference rooms, auditorium and television studios. It has been staffed with individuals experienced in developing seminar programs. It is the hope of the School of Pharmacy that the way will open and a formula can be developed to attract retail pharmacists to the campus and that the home show rather than the road show will be the ultimate goal of the program.

During the 1957-58 school year the two pharmacy schools in the state of Georgia cooperated with the Georgia Pharmaceutical Association in writing a prescription pricing schedule which would serve the needs of Georgia pharmacists. This schedule was presented to pharmacists of the state at various District Meetings of the Pharmaceutical Association. Faculty members of the two schools traveled many miles to reach the pharmacists in their local areas. These meetings were well attended with many pharmacists participating freely in discussions of prescription pricing.

A new era in the history of education is beginning to develop, and perhaps some answers can be found to the problem of how the practicing pharmacist can be reached. Is the seminar on the campus the answer? Is the road program the solution? Is it possible to develop a program through direct mail or employing the person-to-person approach as do our pharmaceutical manufacturers? What are the possibilities of educational television?* Perhaps the solution can be found in one of these areas.

It has been our experience in presenting pharmacy extension programs throughout the state of Georgia that the closer the topic is to the pocketbook, the greater the attendance and interest. It is recognized that some presentations on pharmaceutical economics are necessary. However, continued scheduling of this type program creates a commercial rather than a professional aura for pharmacy. This will eventually result in harmful public relations.

We mentioned pharmaceutical economics above. At this point it may be well to observe our own economic accounting regarding seminars for retail pharmacists. The question might be asked, "What is the *real* cost of presenting a seminar?" It is not unusual to observe large seminars with the attendant expenses for a relatively small number of pharmacists. Do not be fooled by attendance figures which include wives, detail men, wholesale house salesmen, etc. The important question is, "How many practicing pharmacists are present?" Then there is the consideration of the cost per pharmacist reached in such a seminar.

When all these factors are analyzed, there may be some basis for the conclusion that many seminars have an abnormally high cost factor and do not really reach the people who should be reached—the pharmacists.

What, then, is the answer to this situation? A possible solution may lie in a new approach to pharmacy extension service. This new approach should be aimed at two objectives: (1) a more practical grass-roots program which

*Reference is made here to education television stations, such as might be in operation on a large campus.

would meet the needs of local pharmacists for continuing their professional education at the local level and (2) improved professional and public relations through adequate publicity for *professional* programs.

In considering the first of these objectives, it has been pointed out earlier that there is a certain amount of resistance toward seminars on the part of retail pharmacists. One of the big drawbacks appears to be the heavy work schedule of the average retail pharmacist. Many pharmacists state that they simply cannot leave their stores, either from the business or legal standpoint. While it must be admitted that this is a logical excuse in some cases, there are strong indications that it is an alibi in others. After-hour meetings during the week days and seminars on Sundays should put the retail pharmacist to the test as far as this excuse is concerned. This is particularly so in those areas where drugstores are closed on Sundays.

As was mentioned in the first objective, new approaches should be tailored to meet the needs of local pharmacists at the local level. In the opinion of the writers, too much subject material dealing with remote problems or situations will discourage local interest in a seminar or district meeting. Pharmacists, like other groups, are also interested in professional and commercial problems of a local nature. Perhaps the answer to this phase of the problem lies in a healthy balance between national interests and local interests as well as a balance between professional material and commercial material.

This leads to an inspection of the second objective: improved professional and public relations. The greater the extent to which the program content deals with local problems, the greater the opportunity for local pharmacists to participate. This in itself has good publicity value. A local pharmacist, or pharmacists, on a seminar program would enhance his or their stature with both the public and other professional groups. A competitive spirit for professional status might even be aroused among the local pharmacists. In planning such a program it would be necessary to screen the participants to assure presentations by capable individuals. Such a program would need considerable supervision.

This approach to Pharmacy Extension Service should lay the ground work for annual or semi-annual seminars at the state level. By stimulating interest in local meetings, pharmacists may want to expand their continuing education activities into the pharmacy college.

In selecting groups of individuals to "spearhead" an enlightened Pharmacy Extension Service, several groups should be emphasized. New graduates, with their fresh pharmaceutical knowledge and enthusiasm of youth, make an excellent core around which to build an enlightened program. An equally important group are the hospital pharmacists. The hospital pharmacists for many years have demonstrated their interest and ability to add professional stature to the practice of pharmacy. As an example, the Georgia Society of Hospital Pharmacists is having a week-end seminar in the fall of 1958 and is considering holding a regional seminar for hospital pharmacists in the spring of 1959 at the Georgia Center for Continuing Education.

Pharmaceutical manufacturers and drug wholesalers can also add their influence to a pharmacy extension program which is designed to raise the professional standing of pharmacy by lending their financial backing. Some sponsorship is imperative in order to insure a well-balanced professional program; therefore, the pharmaceutical manufacturers and drug wholesalers who

carry on extensive operations in the regional area of the pharmacy college should be the potential sponsors. For example, the pharmaceutical manufacturers who are based in Atlanta, Georgia, and represent the southeastern region of the United States are sponsoring two such conferences: the Second Annual Pre-Pharmacy Advisors' Conference and the Georgia Society of Hospital Pharmacists Seminar, both of which were held in October, 1958, at the Georgia Center for Continuing Education. In the spring of 1958 the Georgia drug wholesalers sponsored the Student-Faculty-Alumni Day which was mentioned earlier.

We have pointed out that the need for an effective program of continuing education for the practicing pharmacists has long been recognized by the University of Georgia. The historical background of continuing pharmacy education in the state of Georgia has shown a pattern of success in the field but indifference at home. The major problem seems to be the search for a formula to attract more interest in pharmacy extension service, whether at home or in the field. The answer to this problem seems to lie somewhere within the framework of the Kellogg Foundation's plan for continuing education.

The direct, or personal, approach through local programs with some local participation included seems to be the best approach. The maximum professional and public relations benefits from this approach will result when the program is balanced between professional and commercial topics. The maximum interest on the part of the practicing pharmacist should result from a program properly balanced with material of national interest and material of local interest.

After reviewing the slow but deliberate progress of our continuing education program for pharmacy in the state of Georgia, we are of the opinion that the present group of retail pharmacists in this area are not "conditioned" to university-centered seminars, and, therefore, preliminary work must be done to sell the values of this service.

Generally speaking, there appears to be a positive professional attitude among the young pharmacists which gives way to a negative professional attitude among some of the older pharmacists. The long-range answer to this situation seems to be the development of professionally enlightened pharmacy groups around strong nuclei of professionally indoctrinated graduates.

REFERENCE

(1) Wilson, Robert C., *Am. J. Pharm. Ed.*, 4, 554 (1940).

Fundamental to all else is the great responsibility education bears for the establishing of all the people in proper morale.

Gilbert W. Mead, Am. J. Pharm. Ed., 6, 49 (1942)

SPECIALIZED COURSES IN CONTINUING EDUCATION

L. F. TICE

The functions and obligations of a college or university today are far greater than some few decades ago. Almost all institutions and particularly those giving technical or professional instruction try to provide some type of continuing education not only for their own graduates but for others having a similar educational background.

When one reads the early history of pharmaceutical education in the United States, it comes somewhat as a surprise to learn that our early colleges of pharmacy offered little more than an organized series of lectures, with no formal laboratory instruction given. All so-called "practical work" was learned by the student working in a pharmacy under his preceptor. Today, laboratory courses make up a very important part of the curriculum in all of our colleges of pharmacy, and the practical experience gained working in a pharmacy, while important, is not considered as a formal part of the student's education. In fact, the trend has gone far in the opposite direction. Pharmacists and those working in many of the specialized fields in pharmacy look to the college of pharmacy as the place where they can go to learn new techniques and procedures which they can then apply in their own professional or industrial activities. This is quite understandable since many of the new developments in pharmacy require some very unusual equipment and apparatus as well as highly specialized training which it is difficult to acquire without instruction by experts. Great credit is due to many colleges of pharmacy in the United States for their efforts in the area of continuing education.

While the so-called "refresher" courses and seminars for pharmacists are extremely useful, it is even more important to give training in those highly specialized techniques which are almost impossible to master without some type of formal instruction. In this brief article, the author wishes to outline briefly two such courses which are given at the Philadelphia College of Pharmacy and Science. Both of these are of a highly technical nature and, yet, are concerned with areas in which many pharmaceutically trained persons are asked to assume new responsibilities for which their basic pharmaceutical education did not and could not possibly prepare them fully. The two courses in continuing education that have been given at the College are radioisotope techniques and parenteral products.

RADIOISOTOPE TECHNIQUES

In the fall of 1951, the College established a radiochemical laboratory and began offering a short course of basic instruction in radioisotope techniques which was made elective for graduate students. Since 1951, the facilities of this laboratory have been considerably increased. Approximately $22,000 worth of radiochemical equipment has been acquired by the College, and an additional $8,000 worth of basic laboratory facilities was obtained through a grant from the Atomic Energy Commission. Four laboratories, each of an average size of eighteen feet by fifteen feet, house the radiochemical equipment which includes six scalers of various types, a counting rate meter, two windowless flow

counters, an Esterline-Angus recorder, a Rectiriter, a Gamma-ray spectrometer and pulse height analyzer, a proportional counter converter, a Tri-Carb liquid scintillation counter, facilities for Bernstein-Ballentine gas phase counting, a super-stable high voltage supply (Baird-Atomic), various survey meters, "cutie-pies," a minometer with pocket chambers, pocket dosimeters, Geiger-Müller tubes of various types, and miscellaneous accessories used in laboratories utilizing radioisotope techniques. Also, such instrumental facilities as a Beckman IR-4 infrared spectrophotometer, two Beckman ultraviolet spectrophotometers (one with a flame photometer attachment), three Coleman spectrophotometers, a Klett Photofluorimeter, several photoelectric colorimeters, and chromatographic apparatus of various types are available for use in experiments which require this additional equipment.

The present basic radiochemical course of eighty clock hours of didactic and laboratory instruction is regularly offered during the academic year as an elective for senior pharmacy majors, as well as for graduate students and college graduates desiring to take the course separately.

Because of the interest in the course on the part of pharmacy graduates, the basic course of instruction is also offered as a special two-week "Institute" during the summer. Five such institutes have already been held, the registrants representing industrial, governmental, and hospital laboratories all over the United States and several foreign countries. This year's "Fifth Annual Radiochemical Institute" was expanded to three separate courses given by twenty-two faculty and guest lecturers. The courses were:

I. Principles of Radioactivity Measurement (2 weeks).

This was a two-week introductory course for individuals with a basic science background but no previous experience with radioisotopes. Lectures and laboratory work dealt with radioactive decay, half-life determination, backscattering, dead-time, nuclear reactions, units and standards, properties of radiation, statistical considerations, basic instrumentation, radiation protection, use of radioisotopes in kinetic studies, chromatographic applications, and other topics. An industrial radiochemical laboratory was visited by the student group.

II. Biological and Medical Applications of Radioisotopes (1 week).

This was a one-week advanced course for individuals with some background in radioisotopes. Lectures and laboratory experiments dealt with standardization procedures, dosage and dosimetry and applications in the fields of biochemistry, pharmacology, bacteriology, serology, medicine, and allied fields. Field trips to radioisotope departments of several hospitals were made.

III. Radiochemical Instrumentation (1 week).

This was a one-week course for individuals with some background of knowledge and experience. Lectures and laboratory experiments presented basic electronic concepts, theory of special circuits used in scalers and radiation detection and associated equipment, and use of various types of commercial equipment, including pulse analysis and liquid scintillation counting apparatus. From more than thirty-five available experiments, graduated in complexity, were selected the particular group suitable to the background and need of the individual student.

Approximately forty hours of instruction were provided weekly in each course. A total of approximately one hundred and twenty-five persons have attended these summer institutes since their inception.

The Radiochemistry Laboratory was organized by Dr. Arthur Osol, Director of the Chemistry Department. It is now a major activity of the department and is under the direction of Dr. Grafton D. Chase, a member of the staff. Dr. Osol received his academic training in radiochemistry, first, while a graduate student at the University of Pennsylvania and, more recently, at the

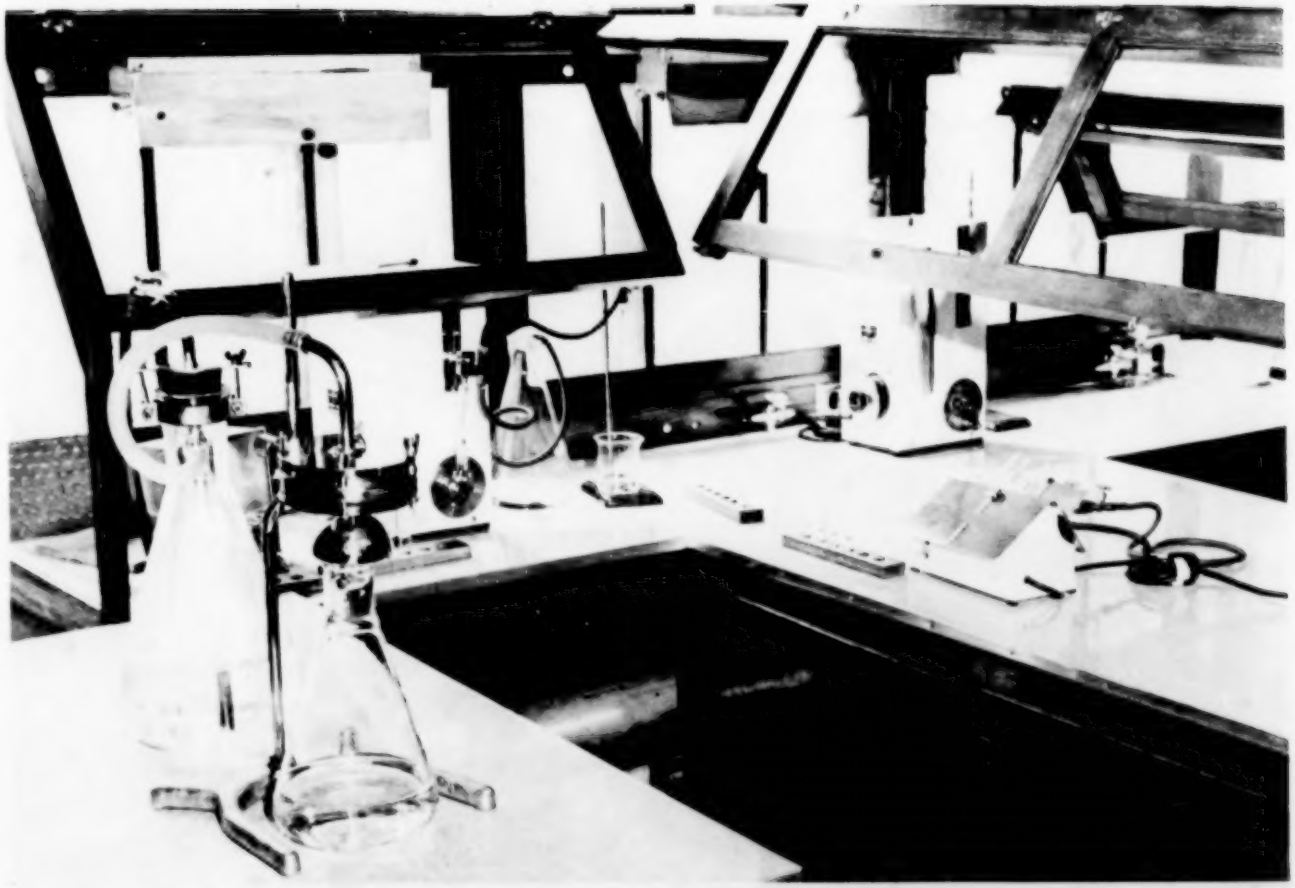

FIG. 1. EQUIPMENT ASSEMBLY FOR PRESSURE FILTRATION AND FILLING AND SEALING OF AMPULS IN PARENTERALS LABORATORY

FIG. 2. GAMMA RAY SPECTROMETER

AN AUTOMATIC RECORDING SPECTROMETER. THIS INSTRUMENT COVERS THE X-RAY AND GAMMA RAY REGIONS OF THE ELECTROMAGNETIC SPECTRUM. IT IS PARTICULARLY USEFUL FOR THE IDENTIFICATION AND ASSAY OF GAMMA-EMITTING RADIOISOTOPES.

FIG. 3. LIQUID SCINTILLATION COUNTER

THE LIQUID SCINTILLATION COUNTER IS ESPECIALLY USEFUL FOR CARBON AND TRITIUM TRACER TECHNIQUES. THE RADIOACTIVE SAMPLE IS DISSOLVED IN A PHOSPHOR SOLUTION AND PLACED IN THE DEEP FREEZE WHERE TWO PHOTOMULTIPLIER TUBES DETECT THE TINY FLASHES OF LIGHT PRODUCED BY THE DECAYING ATOMS. EACH FLASH, REPRESENTING A DECAYING ATOM, IS RECORDED ON THE UNIT TO THE RIGHT.

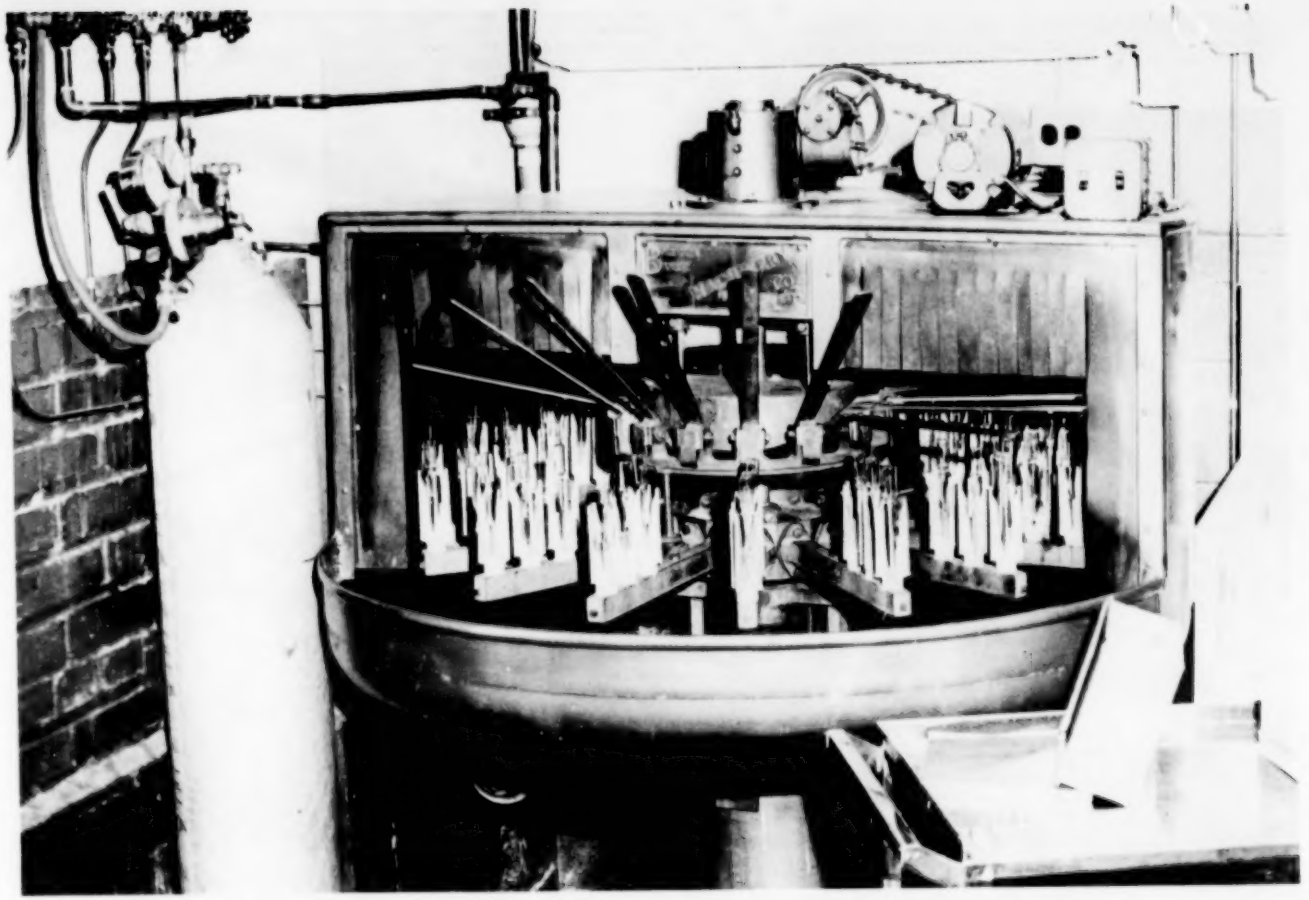

FIG. 4. ROTARY AMPUL RINSER IN PARENTERALS LABORATORY

Oak Ridge Institute of Nuclear Studies. Dr. Chase completed basic and specialized courses of instruction at the Oak Ridge Institute.

Dr. Osol and Dr. Chase have helped to organize—through supplying copies of their laboratory instruction manual and other material in answer to requests for such information—facilities and courses for instruction in eighteen institutions in the United States, Canada, England, Scotland, Australia, Germany, and Venezuela. Dr. Chase organized a laboratory in Maracaibo, Venezuela, while in that country two years ago, and Dr. Osol participated in the organization of a radiochemical teaching program at the University of Berlin during a visit there in 1956.

PARENTERAL PRODUCTS

The second specialized course given at the College is one in the preparation of parenteral products. This came into being at the request of the Philadelphia Hospital Pharmacists Association. For a number of years, the College had offered a rather extensive course in this work which was elective for graduate students. The instruction given to undergraduates is by necessity somewhat limited in scope and does not prepare the student to assume full responsibility for the preparation of parenterals on a large scale. Many hospital pharmacists in recent years have been asked by their hospital administrators to supervise or take on the duties of manufacturing parenterals. This frequently meant that they would be in full charge of all such products, including bulk fluids for parenteral use. While the hospital administrator is usually motivated by the economics involved, there is imposed on the pharmacist a heavy responsibility to see that products are made properly and with full quality control. Many other pharmacists are engaged in parenteral manufacture either in production or in the research department of one of the pharmaceutical manufacturers. Many of these pharmaceutically trained people have had little or no formal course work in this important area, and the technology in this field has made great progress in recent years.

The Parenterals Laboratory at the Philadelphia College of Pharmacy and Science is an air-conditioned room with admitted air filtered by electrostatic filters. The room is kept under positive pressure at all times during its operation. The usual equipment that might be expected is available including autoclaves, hoods for filling and sealing operations, incubators for sterility testing, etc. The laboratory is equipped for filling and sealing under inert gases such as nitrogen, and utraviolet sterilamps are used both on the ceiling of the laboratory as well as in the hoods directly over the filling areas. In a laboratory immediately adjacent is a full production-size ampul washer which washes the empty ampuls with tap water, steam, and distilled water and then air dries them. The laboratory is equipped to prepare water for injection by distillation as well as by the Selas Steril-Aqua system which functions by the filtration and condensation of steam from the central heating plant of the College. The course itself covers all aspects of parenteral manufacture and quality control including sterility and pyrogen testing. Pyrogen testing is done in the Pharmacology Laboratory which also is air-conditioned, as is the adjacent animal room.

The course in parenteral products is given by Dr. Kenneth E. Avis, Associate Professor of Pharmacy at the College. Dr. Avis also presents the regular graduate course in parenterals which is given each year in addition to the

special course given during the summer. Dr. Avis did his doctoral research in this field and investigated the problem of the sterilization and sterility testing of oleaginous parenteral medications. He has been a frequent speaker before the Parenteral Drug Association at its meetings in New York. The summer course in parenterals has been very well attended, and it has been made available not only to those with a pharmaceutical training but to those with a similar or equivalent academic background. Although some applications for the course were received from registered nurses, it was not felt that they were sufficiently prepared in the basic sciences to permit them to register. A few bacteriologists have been accepted in the course and have done quite well in it.

It was interesting to observe that some industry personnel who had had considerable experience in parenterals enrolled in the course. Their reason for doing this, as they stated it, was to give them a new stimulus in their thinking and to prevent the mental stagnation which frequently accompanies routine production work.

INFLUENCE ON FACULTY

The presentation of courses such as the two which the author has described is a service and of value not only to pharmacists and others who register for the training but to the institution itself. A teaching staff which accepts the challenge of presenting new technological developments as continuing education is certain to avoid the common pitfall of academic stagnation which is one of the hazards which face all teachers. It frequently happens that college professors themselves are amazed at the new equipment and new techniques which they see on visiting modern industrial and research laboratories. Those teachers who accept the responsibility of teaching courses in continuing education must themselves remain in the forefront of new developments if their courses are to be meaningful. Our undergraduate students and even our graduate students do not represent the critical group which comes to us from the professions and from industry and who, themselves, are quite well informed. To really teach a group such as this means that the teacher himself must be even better trained and informed than his regular college course requires of him.

Those on our college staff who have participated in this program are as enthusiastic over their own experience in the program as those who have taken the course. Like all good teaching programs, it is a mutually satisfactory and rewarding process.

I believe the most important service that can be rendered our profession today is to have a generation of pharmacists that are historically minded and filled with the visions and dreams that the knowledge of the accomplishments of pharmacists inspire.

Rufus A. Lyman, Am. J. Pharm. Ed., 7, 43 (1943)

A NOTE ON CONTINUING EDUCATION AT TEMPLE UNIVERSITY

JOSEPH B. SPROWLS

Opportunities for continuing education in pharmacy at Temple University have been organized along three lines, as follows:

1. Informal lecture programs sponsored by the Pharmacy Alumni Association.
2. Seminars offered with the collaboration of county or metropolitan pharmaceutical associations.
3. Noncredit courses offered through the Management Institute of Temple University.

The Deans' Lectures is the title given to a lecture series arranged annually by the Pharmacy Alumni Association in honor of the former deans of the school. Speakers of national prominence are invited to appear on the programs, and the lectures are offered without charge for the benefit of pharmacists in the Philadelphia area. Attendance at most of the sessions has been disappointing.

Seminar programs are arranged at the request of various pharmaceutical associations. Usually three or four are scheduled during an academic year. The School of Pharmacy provides speakers from its faculty; the local association is responsible for making all arrangements and financing all costs. These seminars have been well received and well attended. They seem to fill a definite need in the continuing education of the practicing pharmacist.

During the last two years a series of noncredit courses has been offered through the Management Institute of Temple University. The Management Institute is an adult education agency which attempts to provide specialized courses as needed by industry, by management groups, and by other organized groups. Registration is limited, and the courses are self-supporting; hence, substantial fees are charged. Thus far the following courses have been offered:

Hospital Administration—for a local association of hospital pharmacists.

Review of Pharmacology—offered at large to retail and hospital pharmacists and employees of the pharmaceutical industry.

Advanced Pharmacology—offered to a selected group of research workers and pharmacists.

The response to these courses has varied somewhat with the ability of the instructor or instructors involved; however, the reception which they received has insured that the pattern will be continued. Reservations are now being taken for a course in physical pharmacy which will be offered for the benefit of workers in the research departments of local companies who may have graduated before this subject matter was introduced into the curriculum.

Instruction for the course offered through the Management Institute has been obtained either from the faculty of the School of Pharmacy or from the research staffs of Philadelphia firms. The course in hospital administration was given by the administrator of one of the large hospitals in the city. Located as we are in close proximity to so many experts in the specialties within pharmacy, we at Temple University feel that we have found a means by which we can render a definite service to the local pharmaceutical industry —that is, by continuing to suggest and to outline courses which may be offered through the Management Institute.

POSTGRADUATE PHARMACEUTICAL EDUCATION IN FRANCE

GEORGES CUVIER

At the present time, pharmaceutical education in France is provided by the four autonomous Faculties at Paris, Montpellier, Strasbourg, and Nancy; in the pharmacy departments of the mixed Faculties of Medicine and Pharmacy, and in the pharmacy sections of the "Ecoles Nationales" of medicine and pharmacy situated throughout the country, forming twenty or thirty divisions.

The arrangement of the curriculum is controled with reference to the law of May 4, 1937, but a project of reform is at present before the Government Councils concerned.

The studies comprise a preliminary year of practical apprenticeship served in a pharmacy, followed by four years of full-time study, the subjects dealt with being as follows.

First year: Physics. Chemistry, Inorganic and Organic. Zoology. Botany.

Second year: Physics. Inorganic Chemistry. Organic Chemistry. Physiology. Botany. Pharmacognosy. Galenical Pharmacy. Chemical Pharmacy. Analytical Chemistry.

Third year: Pharmacognosy. Galenical Pharmacy. Chemical Pharmacy. Analytical Chemistry. Toxicology. Pharmaco-dynamy. Cryptogamy. Microbiology. Biochemistry.

Fourth year: Microbiology, Biochemistry. Pharmaceutical Legislation. Hydrology. Hygiene.

At the end of the fourth year of study, the student passing the three end-of-year examinations and also the three end-of-study examinations obtains the "diplôme de pharmacien" allowing him to practice as a pharmacist provided that he is twenty-five years old.

This is, in effect, the theory. In practice the number of qualified pharmacists turned out annually by the Faculty at Paris alone is about two hundred and fifty. Taking into account the number of students qualifying in the provinces, the statistics should show a normal output of 1,000 newly qualified pharmacists. This number would be absorbed with difficulty, due to the effectice limit of 13,000-14,000 pharmacies in France.

This is the reason why most of the newly qualified pharmacists are unable to use their qualification in a dispensary and therefore gravitate towards careers in the laboratory.

The advancement of techniques and the evolution of biological and medical science have caused important changes in pharmaceutical practice. Traditional preparations have given place more and more to the specialities formulated and prepared in these laboratories, where students are able to find interest in applying the knowledge gained in the university, thus utilizing their qualification fully.

Medical analysis necessitates numerous and varied biological analytical techniques, and this has caused the creation of analytical laboratories. These laboratories are controlled by the legislature which restricts their direction to persons holding a specialized qualification.

These qualifications require the newly qualified pharmacist to undergo a specialized course followed by an examination. This qualification allows those concerned to class themselves as specialists in the applications and procedures of modern scientific method in its evolutionary form.

The Faculty of Pharmacy at Paris, in common with most of the provincial Faculties, was required to organize these complementary studies corresponding to the various specialities.

Six of these "Certificats d'Etudes Supérieures" have therefore been created to which students may enter following a highly selective examination, the number of students being governed by laboratory facilities.

The Certificat d'Etudes Supérieures in Applied Chemical Biology aims at providing the future directors of laboratories of medical analysis with the biochemical knowledge which is indispensable in this field. The course is designed to give a background which comprises the acquisition, with a biochemical bias, of a deepened practical and theoretical knowledge of analytical chemistry, physical chemistry, and hormonology. The course is directed by the professor holding the Chair of Biological Chemistry, Professor Courtois.

The Certificat d'Etudes Supérieures in Microbiology, Serology, Hematology, and Parasitology consists of lectures and practical work in the discipline concerned with participation in hospital services and special visits. The courses here are directed by the Professors of Microbiology and Zoology, Melle Lambin and Mr. Raoul, respectively.

The Certificat d'Etudes Supérieures of Pharmacotechnie (Extraction and Chemistry of Synthesis) and Certificat d'Etudes Supérieures of Pharmacodynamics and Biological Assay are granted by the Institut de Pharmacotechnie et Pharmacodynamie which was founded in 1947 at the Faculty of Pharmacy at Paris and which functions by grants from the "Chambre Syndicale des Fabricants de Produits Pharmaceutiques." Under the direction of the Professors Janot, Valette, Raoul, and Moreau, and supported by highly qualified personnel and specialized up-to-date equipment, the laboratories of the Institute provide instruction in the newer techniques. The annual selection of students insures that the seven or eight candidates following this course will obtain benefit from these courses, and provide research and control laboratories in industry with fully qualified management.

At the beginning of the academic year 1956-57, two new certificates were initiated in the Faculty at Paris. These were the Certificat d'Etudes Supérieures in Physico-Chemical Analysis and the Certificat d'Etudes Supérieures in Biological Analysis. These qualifications are directed at the control of medicines and are arranged to provide specialists in medicament control, who should readily find a position in industry with their specialized knowledge.

Each certificate requires one year of study due to the complexity and diversity of the theoretical and practical knowledge which must be acquired.

The Faculty of Pharmacy in Paris has also been authorized to grant four "certificats d'études spéciales" for which the curriculum and examination are being controlled on a nation-wide basis, so that this type of qualification will interest pharmacists wishing to acquire a specialized knowledge and qualification of use in their professional activities. These qualifications permit the

opening of Laboratories of Biological Analysis for analyses in biochemistry, bacteriology, hematology, and parasitology.

The content of the Certificat d'Etudes Supérieures naturally has a bearing on the special certificates, but the latter do not attain the same depth. The access to the Certificat d'Etudes Supérieures, however, is still limited to those capable of distinguishing themselves in research, teaching posts, etc.

These certificates are conferred after a final examination, comprising a written portion which is submitted to a national jury, followed by a practical test and oral examination.

The most long-standing "Certificat d'Etudes Spéciales," that in immunology applied to venereal diagnosis, is controlled by a ministerial decree of November 16, 1948, and is open to pharmacists and students who have completed their fourth year. The course consists of thirty-five individual practical sessions and a period of application in the field, followed by written, practical, and oral examinations.

To limit the number of candidates a selective examination is held at the commencement of the course, as the output, thirty each session, is controlled by the number of positions available.

Along with the certificates of a scientific character conveying a qualification determining professional orientation, the Faculty at Paris has been delivering up to the present a Certificate in Optical and Acoustical Instruments which permits a pharmacist to open a department of this nature in his pharmacy.

Following many controversies and recent advancements in hearing aids the government was led to seek reform in the nature of this certificate. A decree of November 21, 1957, created a Certificate in Acoustics applied to auditory prostheses, which the Faculty at Paris is able to deliver to qualified pharmacists in Paris and the provinces following a special course. This qualification came into being in the academic year 1957-58 and permits pharmacists to place auditory prostheses on sale to the public.

Negotiations have also been taking place for the creation of a similar qualification in applied optics, but its final acceptance has as yet not been passed.

A complementary Certificate in Phytopharmacy is also open to pharmacists who follow a compressed course of lectures and practice held in October of each year, the examination being held in the following year.

Finally the Certificate in Toxicology and Industrial Sanitation methods is open to a dozen qualified pharmacists or persons with an equivalent qualification. Its aim is to provide technicians grounded in industrial toxicology and sanitary techniques.

DEVELOPMENTS IN ANALYTICAL CHEMISTRY

Several years ago, the interest in bromatology produced the organization in the Faculty of Paris of a series of lectures on analytical advances given by foreign and French specialists. These lectures served to show students, research workers, and others interested in this subject, an outline of food analysis in its most modern, scientific, and industrial form.

COMPLEMENTARY COURSES IN BUSINESS METHODS AS APPLIED TO PHARMACY

The course is undertaken under the direction of the Professor of Legislation and Deontology with the assistance of a Professor of the School of Higher Commercial Studies (H.E.C.). In eight, two-hour lessons, held on Saturdays in February and March between half-past five and half-past seven, the subjects dealt with are bookkeeping methods, business and documentation, the inventory and balance, the structure of commerce. This course, organized by the "Société des Amis de la Faculté de Pharmacie de Paris," is created to appeal to practicing pharmacists and final-year students, and it is free.

It is related to certain lectures given in the course of industrial pharmacy.

INSTITUTE OF INDUSTRIAL PHARMACY

Under this title are grouped the special lectures organized by the National Chamber of the Manufacturers Syndicate to which body the Faculty of Pharmacy owes its position and patronage. The lectures are held in the evenings at eight thirty, three times a week, from November until June, and comprise four subjects: publicity, technology, commercial practice, social practice. They are given by specialist speakers chosen from the business and civic laboratories, and serve to keep pharmacists in laboratories and pharmacies up to date on industrial procedures and to familiarize them with subjects of interest concerning control and function in manufacturing and control laboratories.

Side by side with theoretical teaching, and thorough up-to-date documentation distributed among the students, factory and laboratory visits are organized. The various industrial techniques met with during these visits form the subject of a written examination paper which permits students to obtain a Diploma of the Institute of Industrial Pharmacy, signed by the President of the Chamber of the Syndicate of Pharmaceutical Manufacturers.

The activities of this Institute create research technicians for manufacturing laboratories, and the success of this initiative becomes increasingly apparent, year by year.

About fifty students follow this course, and an equal number living around Paris attend laboratories throughout the country. There are even laboratories in the French Union Overseas which receive the documentation and practice control techniques which permit them to possess the diploma of the Institute.

Registration for this course is received at the Chambre Syndicale des Fabricants, 88, Rue de la Faisanderie, Paris XVI^{e}.

COURSES IN EMERGENCY TREATMENT OF ACCIDENTS

Conforming to the ministerial instructions of 1952 concerning the need to develop a course of this sort, the 'Société des Secouristes" was called upon to organize, each year from January to March, nine sessions to be held on Mondays eight thirty to ten in the evening with the necessary lectures and demonstrations.

This course is intended to interest the pharmacists and students at the Faculty. The program allows them to spend one evening each week in gaining an extremely useful and practical knowledge of emergency methods. A diploma indicating that the participant has conscientiously followed the program is delivered at the end of the course which has been running successfully since 1952-1953.

MAKING POSTGRADUATE REFRESHER COURSES MORE PRACTICAL*

LOUIS E. KAZIN

My assignment is to discuss that area of activity commonly referred to as "refresher work" for retail pharmacists with respect to the use of outside specialists in presenting the necessary informative material.

By outside specialists, we mean all those people who are in a position to make contributions to refresher programs, but are not directly associated with colleges of pharmacy in a teaching capacity.

While we're on the subject of terminology, may we point out that we plan to use the terms "postgraduate refresher programs," "continuation studies," or "extension service courses," interchangeably in this discussion.

We realize that these terms have different meanings at various levels of academic activity. However, we believe that today's issue can be best served if we are allowed to utilize the widest latitude with reference to the terminology usually associated with the subject at hand.

Our objective, as we see it, is to make more retail pharmacists aware of the fact that the education of a professional person never really ceases. As such, continuation studies which are so organized as to review basic fundamentals in conjunction with the introduction of information concerning new developments make worth-while contributions to the professional and business strength of the pharmacy practitioner.

However, there still appears to be a lack of sufficient interest on the part of the practitioner in these programs. When we consider the revolutionary changes in pharmacy during the last two decades and the strong competitive forces now facing the field, such apathy could be dangerous to pharmacy's future economic and professional position.

Colleges of pharmacy have long been aware of this problem and have been giving increased attention to the planning of postgraduate programs, continuation studies, or extension services. This is as it should be, for pharmacy colleges, as the basic educational force of the field, should assume dominant roles in formalizing these highly important refresher programs or continuation studies. We recognize, of course, that certain financial and manpower problems may limit the contributions of some colleges to this field of refresher activity.

If these factors be a problem, then is it not conceivable that the judicious use of outside specialists might serve to minimize the load placed on the financial and manpower resources of a particular college? Furthermore, it should be realized that all segments of the pharmaceutical field in addition to education have responsibilities towards furthering the refresher objectives. These segments, which include manufacturers, wholesalers, retail and hospital pharmacists, advertising and marketing experts, governmental and armed forces personnel, and pharmaceutical journalists, are in a position to make significant contributions to postgraduate refresher programs. In our opinion, they should be consulted in planning these projects.

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*Presented to the Section on Education and Legislation, A.Ph.A., New York City, 1957.

It is also advisable that their services be utilized in an instructional capacity. It is within this latter area that we believe the outside specialists can make their greatest contributions. If extension service programs are to meet the needs and desires of the practitioners, then it becomes necessary to solicit opinions from as large a cross section of the pharmaceutical field as possible. The specialists representing the various segments we have just listed constitute such a cross section.

In addition, this type of personnel has become most expert in dealing with practicalities and day-by-day problems confronting the pharmacy practitioner. As such, they are in a position to tailor their approach to fit the particular needs and interests of the practicing pharmacist in a given locality or area. We'll admit that this emphasis on the so-called practical approach can sometimes be overdone. There is a place for basic theory in refresher work. Whether the subject material under discussion be scientific, professional, or business in nature, certain fundamentals must be emphasized time and again, by the educator or by the outside specialist.

In all probability, what we are seeking is a balanced refresher approach which recognizes the areas of responsibility of both teachers and outside specialists and the respective talents they can bring to bear on this problem of making these continuation studies more interesting to the pharmacy practitioner.

In other words, determination of the subject material discussed or presented at these refresher programs should not rest solely in the hands of the educator. We submit again, however, that the responsibility for coordinating such activities should rest within the purview of the colleges.

This mention of coordination enables me to introduce another facet of college responsibility which, in a sense, could have a more or less direct bearing on the pharmacy practitioner's interest in refresher work.

Our field has become quite complex and diversified in recent years. All signs point to a continuation of this trend. As a result, there is a lamentable lack of cohesiveness among the various segments which go to make up the pharmaceutical field. This has allowed distortions, misrepresentations, and misunderstandings to flourish among these facets of pharmaceutical activity to the extent that dangerously disruptive potentials have been permitted to exist and grow without interference.

There is a need for a better understanding among these segments. There can be little justification for this lack of cohesiveness. Therefore, we suggest that within this field of continuation studies, consideration be given to the need for developing on the part of the practicing pharmacist, and, we might add, representatives of all other segments in the field, a better understanding of the trends and developments which have wrought so many changes within our profession and industry.

All of us are aware of the fact that it becomes a little difficult for the practicing pharmacist to draw a sharp mental line between the new drug developments of a particular company and its trade relations policy. Competitive inroads on the part of nondrug outlets have created unnecessary conflicts between manufacturer, wholesaler, and retailer. There is a constant need for an almost day-by-day interpretation of laws and regulations affecting the pharmaceutical field. Association responsibilities and its functions plus its contribution to pharmaceutical strength need to be more firmly implanted in the minds of the pharmacy practitioners.

There are, of course, areas of instruction for special groups such as hospital pharmacy, research and production personnel in industry, and marketing and advertising experts.

The list of subject material for refresher activity is endless, but even in this very superficial exploration of areas of discussion, there are obvious contributions which outside specialists can make towards stimulating interest in them. We believe it is imperative that colleges of pharmacy contemplating or participating in postgraduate instructional programs for practicing pharmacists give due consideration to the fact that these practitioners want to be in a position to discuss their problems and potentialities with those individuals with whom they have the closest contact, either through necessity or desire.

The outside specialists we refer to fit this description. It is our belief, therefore, that a coordinated program which gives full weight to these factors we have discussed so briefly will make the postgraduate refresher or extension service program effort more practical and acceptable to practicing pharmacists with an obvious increase in their participation in these educational activities.

We must, therefore, have education in the American ideal, unending and uninterrupted. It must be practical and realistic, facing the problems of today as they arise, and not an education which is lost in the philosophical speculation of the ancients or of the medieval scholastics. It must be the education which is of the whole man—and that man an intelligent citizen in action.

Gilbert W. Mead, Am. J. Pharm. Ed., 6, 49 (1942)

Liberal Education and American Pharmacy and Liberal Education and American Pharmacy, A Bibliography

BY

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LIBERAL EDUCATION AND AMERICAN PHARMACY

KEVIN P. BUNNELL

INTRODUCTION

In recent years it has become increasingly necessary for educated Americans to play two roles in our culture. They are expected to be competent in some professional area, and at the same time they must be effective members of society. It is the function of liberal education to provide the broad social, intellectual, and personal competencies which enable the professional person to perform both roles well.

Responding to this demand for broadly educated citizens, American educators have intensified their interest in the place of liberal studies in professional education. One manifestation of this interest is the research now being conducted at the Institute of Higher Education, Teachers College, Columbia University, in an effort to assess the role of liberal education in certain undergraduate professional curricula.

Pharmaceutical educators have displayed a mounting interest in liberal education. This is partly because the colleges of pharmacy are now laying plans for an expanded educational program. From all sides come recommendations that liberal studies be given a larger place in the curriculum. The purpose of this paper is to examine the evolving role of liberal education in the preparation of pharmacists, and to set forth the words of some of the profession's greatest educators concerning this matter—words that should be of value to those charged with planning tomorrow's pharmaceutical curricula.

I. PHARMACEUTICAL EDUCATION BEFORE 1900

In the early stages of American pharmaceutical education, students were trained almost exclusively through the apprentice system. Even during the second half of the nineteenth century when colleges of pharmacy were established in substantial numbers, most of the profession's educators continued to insist that preparation for practice was, first and foremost, a matter of obtaining experience in the drugstore. This view was reflected in the fact that as the state boards of pharmacy began to control admission to the profession in the 1870's and 1880's, they invariably established four years of apprenticeship as a prerequisite for licensure (1). During the early decades of the twentieth century, apprenticeship requirements gradually diminished, but even today the system persists in most states in the form of six-month to one-year internship requirements (2).

The Proprietary Schools. The early schools of pharmacy were founded on a proprietary basis by practicing pharmacists as an adjunct to the apprentice system. Edward Kremers, one of pharmacy's most authoritative historians, described the mid-nineteenth college program this way (3):

> It was the apprenticeship system improved, but still essentially the apprenticeship system. The time spent in the drugstore was, therefore, the prime requisite to a certificate of proficiency. The course or courses of lectures simply served as a kind of superstructure, their prime object being to bring into some system the information and experience irregularly acquired during an apprenticeship and assistantship of four or more years.

In spite of the rapid rise of the academically oriented state university colleges of pharmacy, the apprenticeship-proprietary system dominated pharmaceutical education until well past the turn of the century. A report compiled by J. H. Beal in 1898 for the American Pharmaceutical Association suggests that at least thirty-five of the fifty-three colleges of pharmacy in existence were operated on a proprietary basis (4).

Because these schools were closely tied to the apprentice system, they were forced to observe certain practices which did not always contribute to good pharmaceutical education. Preliminary educational requirements rarely went beyond grammar school education or equivalent achievement. Classes generally met on a late afternoon and evening schedule three days a week. During the latter part of the nineteenth century, more than half the students attended college for only the first year because they found themselves able to meet the legal requirements for practice without completing the two year college course (5). Like the proprietary medical schools, these institutions were business enterprises. Raising standards or expanding the curriculum would mean fewer students and reduced income.

Such conditions were not hospitable to liberal education; for liberal education requires ample time, broadly educated teachers, and a thoroughgoing conviction that professional education is more than vocational training. As it was, the colleges of pharmacy could make no real claim on the time of prospective pharmacists; most of the teaching was done by practicing pharmacists, only a few of whom had broad educations; and, if the literature of the times is any indication, there was no widespread belief that pharmacists should be liberally educated men.

Toward the end of the nineteenth century there developed a rising wave of dissatisfaction with existing pharmaceutical education. In 1889 at the annual meeting of the American Pharmaceutical Association a panel of pharmaceutical educators discussed the role of preliminary education in the preparation of pharmacists. One speaker indicated that the apprenticeship system effectively blocked such preliminary work (6):

> You notice that four years [of apprenticeship] are given as the time required for entering the colleges, and then two years for graduating, making six years. Take six years from twenty-one years, the graduating age, and we have about fifteen years for entering the business. The preliminary education which you have all upheld so highly here must be acquired in the first fifteen years . . .

Even if we take into account that at this stage in American educational history the high school curriculum was primarily college preparatory and much more thoroughly endowed with "hard" subjects than present-day high school programs, it is difficult to imagine how a student of pharmacy could absorb very much liberal education in the time allotted him.

Seventeen years earlier, Edward Parrish, the long-time Dean of the Philadelphia College of Pharmacy, had discussed from another point of view the difficulties of the aspiring pharmacist in obtaining a broad education. Apparently the aristocratic view of liberal education still persisted at this time (7):

> Should a boy designed for the profession of pharmacy, as we call it, have a college education or not? Of course but few can have, as things are. The nature of our business is such that it does not attract those who have the means to prepare themselves for the more lucrative and distinguished professions. We draw our recruits mainly from the great middle class who are too limited in their means to endow their children with the priceless boon, a liberal education. Necessity knows no law, and our apprentice boy must be at work for his bread at seventeen or eighteen years of age, perhaps much younger.

In 1900, William Alpers, a leading pharmacist who received his undergraduate education in Germany, pointed to some of the weaknesses of American pharmaceutical education. He concluded that in no other profession were the preliminary requirements so low. Many colleges literally observed no admission standards whatever; and even those which did pretend to require grammar school or high school preparation rarely rejected a poorly qualified applicant (8).

The low admissions standards should come as no surprise considering the small part the colleges played at the time in the preparation of practitioners. In his 1898 report to the American Pharmaceutical Association, J. H. Beal pointed out that, "According to the best information obtainable from boards of pharmacy, graduates do not number more than about ten per cent of the total of those who are annually registered in the United States, though the percent is undoubtedly higher in some states." (9)

By present standards, the picture of pharmaceutical education reflected here is far from satisfactory. To be fair, however, we must point out that in the late nineteenth century the educational requirements of the professions in general were far below what they are today. Compared with those of other professions during the same period, pharmacy's standards perhaps were not inordinately low. In any case, it is clear that by 1900 considerable dissatisfaction with pharmaceutical education had developed. Prominent among the causes of this dissatisfaction was the feeling that pharmacists received too little general education preliminary to their technical studies.

The University Colleges. The proprietary schools were not to dominate pharmaceutical education indefinitely. The German ideals of scholarship, scientific investigation, and academic discipline which so profoundly altered medical education in the United States were also destined to play a vital role in changing pharmaceutical education.

The first state university college of pharmacy was established at the University of Michigan in 1868; Wisconsin followed in 1883; Indiana in 1884 and Ohio in 1885. By 1900, fourteen such institutions had come into being (10). Here were schools of an entirely new type. Supported financially by the state, they were in a position to lead a drive for the higher entrance requirements and the more rigorous programs of training which would eventually elevate the study of pharmacy to the dignity of an academic discipline. They led the way, too, in pharmaceutical research and in the establishment of graduate programs. Students in the new colleges were able to absorb—directly through courses taken in other parts of the university, and indirectly from the academic atmosphere—a richer and more effective preparation for the practice of pharmacy than could be given in the proprietary schools.

Like the university medical schools at the turn of the century, the university colleges of pharmacy placed heavy emphasis on the sciences and the vocational aspects of pharmaceutical education. Admittedly, attempts were made to broaden the professional curriculum and to add basic theoretical subjects to the practical study of the techniques of pharmacy. But there was no strong, clear-cut move to weave nonscientific liberal studies into the pattern of preparation.

Liberalizing the Technical Curriculum. As we have implied, pharmacy found itself caught up in the rapid scientific changes which took place at the end of the nineteenth century. New discoveries demanded that the compounding as well as the prescription of drugs be put on a more scientific basis. In 1884, one author suggested that the role of the pharmacists was beginning to change (11):

> It is, perhaps, a misfortune, that we live at the present day because I believe that pharmaceutical education is in a transitional stage, and to use a common phrase, is 'neither hawk nor buzzard.' Time has been when all that was considered necessary for one to become a pharmacist was a few (three to five) years' experience with one who bore the title of a pharmacist, or kept what is called a drug-store. Today, something more is required, and a theoretical or college training as well as a simple apprenticeship, is becoming to be considered necessary.

Doctor Eli Long, a physician-professor at the University of Buffalo, suggested in 1899 that the only way to prevent shoddy pharmaceutical practice was to endow pharmacists with more thorough scientific knowledge (12):

> And the writer is convinced that the college training of pharmacists should be as broad as is possible within reasonable limits . . . The average dispenser without college training possesses some knowledge of medicine above that needed in his work and he frequently uses that knowledge improperly. But the college man, if properly trained, though possessing a larger knowledge of facts pertaining to medicine, has learned when *not* to use them . . . The commercial spirit so prominent in the pharmacy of today, with deficient training, must be held responsible for . . . abuses, while the progress in education, as shown in the increase of colleges, gives hope of a better state of affairs in the future.

It is appropriate to point out that Long, as well as many other educators of the period, advocated higher educational standards for another reason. They wanted to restrict the number of people who entered the profession. They attributed much of the commercialism in pharmacy to the cut-throat competition which resulted from a serious oversupply of pharmacists (13):

> Too many pharmacys and too many pharmacists. How may this unhealthy state of affairs be remedied? We answer unhesitatingly: by educating the pharmacist; by weeding out the incapables who drag it down to the plane of vulgar dickering. Do this, and the business will correct itself.

In response to pressures such as those illustrated above, many nineteenth-century pharmaceutical educators, particularly those associated with the university colleges, achieved a thoroughgoing understanding of the importance of broadening and expanding the technical curriculum. To the extent that these men advocated that their students have more background in the basic sciences, and more understanding of theory, in order to communicate with members of related professions, to the extent that they desired to free their students from the limitations of a narrow, technical approach to the profession, these men were concerned with liberalizing the professional curriculum and therefore, in a limited sense, with liberal education.

Enclaves of Interest in Liberal Education. A few pharmaceutical educators, apparently believing that a man with a broad technical education was not necessarily a liberally educated man, went so far as to advocate more extensive programs of general studies for pharmacists. Such men were out of the mainstream of nineteenth-century thinking about pharmaceutical education. Nevertheless, their ideas constituted the soil from which grew the present-day interest in liberal education for pharmacists.

In 1868 while taking part in a discussion at the annual meeting of the American Pharmaceutical Association, Edward Parrish, of the Philadelphia

College of Pharmacy, deplored the practice of taking pharmacy apprentices directly from grade school (14):

> I will tell you my candid opinion—my candid belief, founded on twenty years' experience—that young men are better fitted to come into our stores out of a good, first-rate institution of learning, where their minds have been thoroughly cultivated and trained a year, than they are picked up from the common school, with their crude, cramming system of education, and taught four years the drudgery of the shop. . . . The very first thing after good moral principle in a young man is a liberal, thorough education. . . . When we start to improve our profession, let us begin by insisting on a better preliminary education, the basis not only of success in pharmaceutical education, but the basis of true success in life.

It may be difficult to imagine that one year of high school could accomplish all Parrish suggests. Yet, considering the generally low preliminary requirements observed by the professions at this time, even a brief high school experience would seem to represent a considerable improvement.

A few years later, in another speech, Parrish touched on the same problem again. He pointed to the obstacles which stood in the way of adequate preliminary education and then asked (15):

> Despite all this, do we not feel that a pharmacist certainly ought to have a liberal education if he can afford it? Is it not also plain, that pharmacy never will take rank with the medical profession till it has within its ranks a considerable portion of well-educated, cultured men?

Here is figured forth the persistent desire of pharmacists for parity with the medical profession. This desire continued to motivate the profession toward a broader and more rigorous curriculum.

A more specific statement concerning the values of liberal education came from William C. Alpers in 1900 (16):

> It is not considered a waste of time to spend a number of years in the so-called college proper—the purely academic school without specialization—to train the mind on a broad foundation of general knowledge, and let the student breathe the free atmosphere of professional science and practice, which will secure him in later years against degrading narrowness and total atrophy. The necessity, recognized for centuries in European countries, that the student must be *broadened* before he can *specialize*, is now also recognized by all true educators in our country.

It is interesting that Alpers pointed specifically to two functions of liberal education. On the one hand, it was to sharpen and prepare the mind, and on the other, it was to provide the student with a breadth and depth of understanding which would enable him to continue learning after his formal education was complete.

Thus, by the beginning of the twentieth century, interest in broadening the technical curriculum of pharmacy had developed. But concern for liberal education in the form of nonscientific, college-level studies was rare indeed. Although an occasional voice did speak out in recognition of the *ideals* of liberal education, few pharmaceutical educators saw beyond the grade school or high school as the means of realizing these ideals.

II. THE GENERAL DEVELOPMENT OF PHARMACEUTICAL EDUCATION FROM 1900 TO THE PRESENT

During the present century, education for the profession has evolved from what was essentially an apprentice system to a condition of "academic professionalism" characterized by an increasing tendency to treat the study of pharmacy as an academic discipline, and a growing conviction that nonprofes-

sional studies are an essential part of the preparation of pharmacists. This change implied important developments in the agencies most vitally concerned with pharmaceutical education. The state university colleges, with their well-equipped laboratories and professional teaching staffs, became widely recognized as the most effective agencies for presenting the study of pharmacy in its new academic garb. The proprietary schools, most of which could not afford to install the new, highly expensive academic programs, began to wither away. By 1947, they were all but extinct (17).*

This same period found most of the state boards of pharmacy accepting the contention of the university colleges that preparation for the profession should not revolve around the apprenticeship. Consequently, by 1950 graduation from a college of pharmacy had become a prerequisite for licensure in most states, and apprenticeship requirements had been drastically reduced.

The Professional Organizations. The development of really effective educational associations in pharmacy is essentially a twentieth-century phenomenon. Nevertheless, it is necessary to look back briefly to the later years of the nineteenth century and point to the origins of some of these associations.

Throughout the second half of the last century, the only national agency representing the interests of pharmaceutical education was the American Pharmaceutical Association. While membership was open to all members of the profession, during its early years it was made up largely of educators, and its annual meetings frequently served as a forum for debating educational issues (18).

From 1870 to 1883, there was an abortive attempt to establish a Conference of Teaching Colleges of Pharmacy in an effort to improve the quality of pharmaceutical education. But because the functions of the organization were limited to discussing problems of pharmaceutical education and making recommendations concerning them, it lacked the authority necessary to bring about change. Hence it is little wonder that the high hopes of its founders, " . . . remained almost completely unrewarded." (19)

The failure of the Conference of Teaching Colleges of Pharmacy was symbolic of the general incapacity of pharmacy during the nineteenth century to improve educational standards. The boards of pharmacy demanded no definite educational requirements for licensure; the proprietary schools, because of their very nature, continued to place solvency above high quality; and the retail druggists, fearing that better education would lead to demands for higher salaries, assiduously opposed constructive changes.

In the year 1900, the pharmaceutical educators had another try at organizing themselves and brought into being the American Conference of Pharmaceutical Faculties. However, the forces which had enervated the earlier Conference of Teaching Colleges of Pharmacy evidently persisted during the early years of the twentieth century, for the American Conference of Pharmaceutical Faculties moved very slowly during the first few years of its existence. By 1905 it had a membership of only twenty-three colleges of pharmacy out of a total of eighty (20). And seventeen years were to pass before the Conference members could agree to increase their entrance requirements from a grammar school education to a minimum of two years of high school.

*Kremers' list of "Institutions of Higher Learning in the United States Having or Representing a School of Pharmacy" indicates date of founding and identifies extinct schools.

Following World War I, the effectiveness of the Conference increased rapidly. In 1923 it adopted the four year high school prerequisite. By 1925 it had changed its name to the American Association of Colleges of Pharmacy and lengthened the professional curriculum from two to three years. Seven years later it adopted the four year program. It also established standards for graduate degrees in pharmacy and helped to secure almost universal acceptance of the Pharmaceutical Syllabus, a standardized program of studies for colleges of pharmacy. Writing in 1932, Wortley Rudd pointed to a highly significant change in balance of power which had occurred within the Association. "For more than a decade the university schools have largely controlled its policies and are having a profound influence in liberalizing the pharmaceutical curriculum in the independent schools." (21) During the years immediately preceding World War II, the Association founded its *American Journal of Pharmaceutical Education* and worked to consolidate its gains. Clearly, education for pharmacy had taken on many of the hallmarks of a learned profession.

Immediately after World War II, the biggest news in pharmacy education was the Pharmaceutical Survey, 1946-48. Sponsored by the major pharmaceutical associations, the Survey had the task of assessing the needs of the profession and producing recommendations for its educational program. When the Survey's preliminary conclusions were first published in 1948, the Committee on Curriculum of the American Association of Colleges of Pharmacy strongly supported the Survey recommendation that a two year college-level program be a prerequisite for entrance into the four year schools of pharmacy. But within two years the opposition had marshalled its forces, and the Committee was talking, a bit reluctantly it seemed, about a five year compromise plan. After 1951, when the five year program was first defeated, it was merely a question of how many times the proposition would have to be submitted before it was passed. In 1954, the five year plan won approval. The Association had served as best it could its function as a supporter of improved pharmaceutical education. But the idea of a two year prepharmacy requirement was not dead; the drive toward higher standards continued.

In the meantime another organization which has contributed substantially to the professional strength of pharmacy, the American Council on Pharmaceutical Education, had been founded in 1932. Sponsored jointly by the American Pharmaceutical Association, the National Association of Boards of Pharmacy, the American Association of Colleges of Pharmacy, and the American Council on Education, it is the official accrediting agency for the profession. Although it got under way slowly, by 1942, ten years after it was established, the Council had received applications for accreditation from sixty-six out of the sixty-eight colleges of pharmacy in the United States. All sixty-six had been visited, and sixty-three of them were officially recognized (22).

The role of the National Association of Boards of Pharmacy also has been important in the unfolding drama of pharmaceutical education. In the 1870's and '80's, many of the states organized boards of pharmacy which had as their primary functions the administration of licensure examinations. Throughout the rest of the nineteenth century, these boards were dominated by retail druggists who, for the most part, stood in opposition to the academic concept of pharmaceutical education. Then in 1904, the National Association of Boards of Pharmacy was organized to encourage cooperation among the

states in matters of licensure. From the very beginning, the NABP allied itself with the colleges of pharmacy. By the second decade of this century, many college men had become state board members. Besides being aware of the new role the basic sciences had come to play in their profession, these men also saw clearly that pharmacy had to improve its educational standards if it was to keep pace with the rapid strides taken by professions such as medicine. As a result, the NABP cooperated with the American Pharmaceutical Association and the American Conference of Pharmaceutical Faculties to secure the passage in many states of legislation requiring applicants for licensure to hold a degree from a college of pharmacy (23). This "prerequisite legislation" helped the colleges to achieve new prestige and strength. It is not surprising that some of pharmacy's most dramatic educational advances were made in the 1920's concomitant with the widespread adoption of prerequisite legislation.

Lengthening the Educational Plan. During the twentieth century the profession has made substantial progress in lengthening its plan of education. The first standards established by the Conference of Pharmaceutical Faculties in 1904 required member schools to observe an admissions prerequisite of "a common school education entitling the student to enter high school." This requirement was raised in 1908, 1917, and 1923 to the completion of two, three, and four years of high school, respectively (24).

The first part of the century also saw a marked increase in the minimum yearly requirements governing pharmacy curricula. The 1904 standards of the Conference of Pharmaceutical Faculties set a minimum of forty weeks on the whole two year curriculum. In 1922, the requirement was 1,500 hours of instruction to be given during two thirty-week periods, and in 1932, 3,000 hours given during four years of thirty-two weeks each (25). As we have seen, in 1954 the American Association of Colleges of Pharmacy approved a five year curriculum, this to take effect with the class entering in 1960.

The most obvious purposes in bringing about these changes were, first, to provide a foundation which would maximize students' ability to cope with the new scientific studies; second, to improve the quality of the vocational or professional education; and third, to score a point in the battle being waged, along with the other professions, for improved prestige.

The Changing Curriculum. Thus far, we have discussed two developments —the lengthening of the educational plan in pharmacy and the growing strength of professional associations—both of which were an important part of the transition in pharmaceutical education from the apprentice system to an academically oriented, scientific program. A third factor—namely, the change which took place in the curriculum—also requires some attention. There is need for a thoroughgoing, qualitative and quantitative study of the evolution of the pharmaceutical curriculum from 1900 to the present time. The following material does not represent the results of such a study, but instead, will point to broad patterns of development.

At the turn of the century, pharmaceutical education was confined largely to the vocational problems of manufacturing and dispensing pharmaceutical products. But at this very time, the forces of change were at work. The social and scientific developments which were a part of the national scene, the state universities with their new academically oriented curricula, and the national associations—all these forces acted to strengthen the curriculum.

Nevertheless, as long as the program was confined to two years, little action could be taken on the proposition that pharmacists needed additional courses in the basic sciences and a more thorough background of nonscientific, liberal studies. Then, as the curriculum expanded, first to three, and in 1932 to four years, an increasing number of educators began thinking about what courses in the basic sciences, the humanities, and the social sciences should be added. Many of these people were interested primarily in the sciences and their function as a means of improving the professional aspects of the pharmaceutical curriculum. Others became increasingly aware that the professional man must be service oriented. They pressed for a curriculum, richer in the nonscientific disciplines, which would improve the competence of pharmacists to render service in the broadest sense to customers and to the community as a whole.

The latter group has experienced stormy going whenever the curriculum has been expanded. In 1957, Harold Hewitt, President of the American Association of Colleges of Pharmacy, expressed concern over the fact that as the colleges laid plans for the fifth year, they were not giving adequate attention to the claims of liberal education (26). Today, there seems to be a general agreement that the five year curriculum should provide students of pharmacy with the equivalent of at least one year of liberal studies. These standards are a far cry from the situation in 1900 when prepharmacy requirements did not extend beyond a grammar school education.

III. LIBERAL EDUCATION IN THE PHARMACEUTICAL CURRICULUM 1900 TO THE PRESENT

Given this background of key developments in pharmaceutical education during the twentieth century, it is appropriate to turn now to an analysis of the interplay between them and the ideals of liberal education. How rapidly did the interest in liberal education grow? What kinds of arguments were advanced in its behalf? How did the forces which affected pharmaceutical education in general influence the profession's attitude toward liberal education? These are the kinds of questions the following analysis will attempt to answer.

Beginning in 1925, references to the role of liberal education in the preparation of pharmacists appeared with increasing frequency, reaching a crescendo in the early 1950's during the argument over the five year curriculum. Before 1925, by comparison, statements concerning the importance of liberal education were rare.

1900 to 1925. Naturally enough, many nineteenth-century ideas concerning liberal education were reiterated during the early years of the twentieth century. A few writers continued to think of liberal studies as a means of training the mind or as a luxury to be enjoyed by the aristocracy. A different view of the function of liberal education was expressed in 1903 by Edward Kremers who took the position that recent developments in the methods of studying science and history had made it necessary to use a broader approach in the teaching of pharmacy (27):

> This, however, unquestionably is true, that he who has at least a glimpse of how the present has evolved out of the past will be less dogmatic for such historic information and will be in a better position to recognize the possibilities of the future; that he who has become acquainted with the scientific method will waste less time in solving problems of everyday professional life than he who merely learned to do things according to a rule of thumb.
>
> Let me therefore make an earnest plea for the cultivation of the cultural phases of the pharmaceutical courses of study as opposed to the more apparent technical phases.

To the degree that he sought to free pharmacy students from a narrow, technical view of their profession, Kremers was advocating liberal, or perhaps more accurately, liberalizing education.

Toward the end of the first quarter of the century, Charles O. Lee, a professor of pharmacy at Purdue University, presented a carefully thought out statement on the importance of broadening the pharmacy curriculum. He asserted that one of the functions of education—either liberal or technical—should be to help effect the reconstruction of society (28):

> If education means anything it must fit men and women to meet, adequately, new and changing conditions. Not only that, but each member of a democracy must be taught to feel and bear his definite responsibility to society. Education in a democracy such as ours must create in the individual a personal interest in social relationships and help to form habits of mind which will secure social changes without introducing disorder.

He felt that this function of education was related to the practice of pharmacy through the concept of service (29):

> The highest compensation a man can receive is the complete satisfaction of real service rendered. Men trained in pharmacy are trained in technic. . . . Why not bring such knowledge and skill into vital relation with life and society?

Then, combining the ideal of service with his conviction that training in pharmacy should bear a "vital relation with life and society," Lee iterated what amounts to a good definition of liberal education; "Education, then, is really freeing the capacity of the individual, progressively and in the direction of service to society. Something more than technical training is needed for this." (30)

One of the most outspoken proponents of full collegiate education for pharmacists was Frederick J. Wulling, Dean of Pharmacy at the University of Minnesota. In the mid-'20's when education for the profession had not reached even the four year baccalaureate level, he advocated that pharmacy should, " . . . forthwith require completion of a junior college course and four years of professional pharmaceutical work as entrance prerequisites to the calling." (31) Of course Wulling was far ahead of his time, for even today pharmacy has not achieved this ideal.

The rarity of such statements as those above attests to the fact that prior to 1925 pharmaceutical educators in general had not awakened to the values of liberal education in the preparation of pharmacists. Such an awakening did occur during what has been called the "renaissance in pharmaceutical education," 1925-1932. But the ideals of liberal education were not thoroughly and forcefully presented until the years following World War II.

1925 to the Present. After 1925, statements about the place of liberal education in the preparation of pharmacists occur frequently enough to suggest the advisability of classifying them according to functions attributed to liberal education. Such a procedure yields five divisions, which are concerned respectively with statements to the effect that liberal education can: (1) augment the professional competence of practitioners, (2) develop their social competence, and (3) their personal competence, (4) contribute to the academic efficiency of the student as he approaches the study of pharmacy, and (5) improve the status of the profession.

Liberal education and professional competence. An examination of the literature of the period from 1925 to 1945 leaves one impressed by the paucity of references to the relationship between liberal education and professional

competence. On the other hand, during the past thirteen years, this relationship has been quite thoroughly explored.

Many post-1945 statements which deal with liberal education and competence in the practice of pharmacy point specifically to the contributions of liberal or nontechnical subjects to the moral fiber of the practitioner, to his professional creativity, and to his ability to deal effectively with the day-to-day problems which arise in his practice. Other statements treat the subject in more general terms. For example, in 1948, Lloyd Blauch, speaking from outside the profession, in an article which previewed the conclusions of the Pharmaceutical Survey, asserted: " . . . professional service is improved by the addition of a considerable amount of general education to the specialized professional training. Without such education the student's outlook is materially limited." (32)

In the same year, James S. Hill, a retail druggist from Niagara Falls, New York, came forth with an unusually positive statement of the value of using a broad approach to produce pharmacists well qualified to solve the problems encountered in practice (33):

> Our syllabus should give the student a well-rounded course in the basic sciences and arts, plus up-to-date knowledge in the art of prescription practice, and from graduation on he will continue to progress and educate himself in his chosen field, ready to meet the difficult problems of the future and solve them to the best advantage of himself and pharmacy as a whole. Why? Because he has been educated rather than trained.

At their 1949 meeting, pharmaceutical educators listened to the words of Earl J. McGrath, member of the American Council on Pharmaceutical Education and later U.S. Commissioner of Education, who focused on the relationship between breadth of educational preparation and professional distinction (34):

> . . . those who achieve distinction in their profession are usually men or women of broad interest and understanding, capacities which have traditionally been thought to develop from the study of the varied disciplines embraced in the liberal arts.

Such expressions of faith in the capacity of liberal education to improve the professional competence of pharmacists were supplemented by the pronouncements of other educators who identified specific objectives in the area of professional practice which might be realized through the addition of liberal studies. In 1949, Lloyd Blauch suggested that besides professional competence in the technical sense, the pharmacist was expected to display certain other essential qualities (35):

> A good general education serves to develop those traits of character and personality that are required for success in any occupation. To have some insight into the values and standards that men have found good in governing their lives, to be able to communicate ideas clearly, to possess the ability to deal with people in a friendly and considerate manner—these, more commonly than we think, perhaps, are some of the elements of professional competence. And these are among the qualities of mind and character that general education is designed to develop.

In the process of arguing for more attention to liberal studies in the new five year curriculum, Dean Adams of the Duquesne University School of Pharmacy recently pointed to another potential outcome of liberal education, namely, creativeness (36):

> Great ideas in science do not originate in the minds of technicians. They come from free-thinkers who have some concept of their heritage and the ability to communicate their ideas freely. If we overload our curriculum with professional courses, we are in danger of losing potential leadership even though we will have the best-trained pharmacists the world has ever known.

Another theme woven throughout the fabric of recent literature on pharmaceutical education emphasizes the broad range of academic studies which are related in one way or another to improving the practice of pharmacy. For example, in 1950 George Urdang of the American Institute of the History of Pharmacy implied that the pharmacist who aspires to maximum professional competence should expose himself to as wide a variety of disciplines as possible (37):

> There is scarcely another profession in existence connected, or to be brought into connection, with so many other human activities as pharmacy. Its basic sciences form the ground work, but through the entire life of the profession, the principles of economics have been of no small importance. Law and legislation, the fine arts, the classics, languages, literature, general history, philosophy, all of them have been applied to pharmacy, have played a more or less important part in the sciences or in the practice of the profession.

The fact that Urdang was suggesting that all these disciplines could be probed in the process of studying the history of pharmacy does not substantially detract from the effectiveness of his statement as an expression of faith in liberal education.

There is another figure in the pattern of arguments for liberal education as a means toward greater professional competence. It relates to the problem of professional morality which pharmacists have long faced by reason of their dual role as businessmen and professional practitioners. G. Lester Anderson, Dean of Administration at the University of Buffalo, has referred to this dual role and the divided loyalties it engenders (38):

> Professional education will lead the student to come to grips with this conflict of loyalties and to make the right choices. But if the student's education in the university has been broad, if he has been challenged to think philosophically—that is, if he has been confronted with the problems of values—his professional problem will be easier of solution.

As we survey the expressions of those interested in pharmaceutical education as a means toward professional competence, one statement seems to epitomize the sense of all the others. It is by Edward C. Elliott, Director of the Pharmaceutical Survey and an educator of great wisdom (39):

> Primarily, the pharmacist is a scientist—that is, he is learner, observer, experimenter, interpreter of a certain group of the forces of nature. The pharmacist applies his science to human beings. Thus, whether he would or not, he is not only a physical and biological scientist, but a social scientist as well.

Those who have committed themselves on the question of the relationship between liberal education and the practice of pharmacy seem to have generated collectively a concept of the behavior of the liberally educated practitioner. He is a person who is able to meet moral and technical problems wisely and who shows promise of being able to do so in the future. He also has the capacity to create and interpret new knowledge in the field of pharmacy. These ideals reflect the faith of the leaders of pharmaceutical education that liberal studies are efficacious in improving the quality of professional practice.

Liberal education and social competence. During the nineteenth and early twentieth centuries, very few spokesmen suggested that studies related to social responsibility should be a part of the pharmaceutical curriculum. Even the period from 1925 to 1945 was a veritable wasteland in this respect.

In contrast, since 1945 there have been numerous references to the relationship between liberal studies and social competence. The discussions of this matter seem to fall into three classifications: those arguing for liberal studies

as a means of generating competence to deal with problems of living in a world of tension; those focusing on the pharmacist's need for skill in the social aspects of daily living and practice; and those which recommend specific courses to meet these needs.

The peace documents had hardly been signed in 1945 when new tensions arose between East and West. At this very time, the profession of pharmacy launched the most thoroughgoing self examination it had ever undertaken. The strong commitment to liberal education of the Pharmaceutical Survey and the pressures of mounting world tensions seem to have converged in the minds of many pharmaceutical educators to produce a heightened interest in the capacity of pharmacists to deal with social issues.

Lloyd Blauch provided a general statement of the pharmacist's social responsibilities (40):

> I need not tell you, therefore, that we must make certain that our professional people of the future shall secure enough general and liberal education to enable them to bear their share of mankind's load and to interest them in doing it. A sizeable amount as represented by at least a minimum of two years of college, must be an earmark of the professions. Certainly more would be highly desirable.

Speaking as President of the American Association of Colleges of Pharmacy, Dr. Troy C. Daniels emphasized the importance of educating pharmacists to grapple with the larger problems of the world (41):

> Repeatedly, informed educators have pointed to the deficiencies in general education offered in most scientific and professional curricula. If this is true of other professions, what might be said for pharmacy? . . . the pharmacist to a greater extent than most professional men and women needs to understand the basic problems of our civilization. He needs a broad perspective that will enable him to make intelligent decisions at the socio-economic level; and above all he needs educational guidance in the responsibilities associated with living in our contemporary civilization.

Other pharmaceutical educators insisted that pharmacists must not only be generally oriented to their social environment, but also that they must develop skill in handling the many social relationships which are a part of day-to-day living and practice (42):

> The pharmacist is a member of society, as well as of a pharmaceutical society. He must adapt and adjust himself to the demands and personalities of many other persons—his employer or his employees, his creditors and his debtors, his suppliers and his customers, his professional colleagues and his non-professional friends. He should be diligent in the discharge of his civic, social, and moral obligations, as well as in the exercise of his professional skills. . . . In view of all his social relationships, a pharmacist needs to understand the nature of the social and economic environment in which he carries on his occupation or makes his home.

Another admirable statement of the relationship between liberal education and the social responsibilities of the pharmacist appeared in the June, 1956, issue of the *South Dakota Journal of Medicine and Pharmacy* (43):

> . . . the public needs and has the right to expect leadership from its professional people. This responsibility the pharmacist must share with the other professions. It is in this area that the pharmacist must establish himself as a person interested in the welfare of his community and demonstrate this interest by giving generously of himself to community problems and government. People expect professional competency and have few doubts about this capacity in a professional person. It is in these other activities that real confidence in you as a responsible person is built. I emphasize this point to illustrate the fact that a curriculum in this day and age designed to train professional people which does not prepare these persons to assume the extra responsibilities of citizenship and community leadership is as outmoded as the Model T in this Rocket age.

At the beginning of this quotation, the author hints that the status of the profession rests to a degree on the ability of pharmacists to deal effectively with social problems. Some years earlier, Dean H. Evert Kendig of the Temple University School of Pharmacy had made this same point (44):

> Parity among the professions is not only a matter of comparable professional service. It also involves a common interest in and understanding of our social problems, the duties of citizenship, the fundamental structure of our government, and the means of maintaining its integrity. If one member of a professional group adopts a high standard of education for its members in the arts and humanities, equality does not exist until the other members reach a similar educational level.

If the pharmacist does indeed carry important social responsibilities, how should the colleges of pharmacy function to provide their students with the competencies needed to execute these responsibilities? George E. Crossen's series of rhetorical questions leaves no doubt about his conviction that the pharmacy curriculum should be liberalized (45):

> . . . where, outside of the drugstore into which approximately 90 per cent of our students will some day go, does one come in closer contact with the sociological problems of a community? Or where does one have greater need for better application for the principles of psychology, logic, philosophy, history, political science, international relations, foundations and weaknesses of national power, and a host of other humanistic topics not even remotely related to the natural sciences?

The important Committee on Curriculum of the American Association of Colleges of Pharmacy also went on record as favoring a wide range of liberal studies (46):

> The Committee holds the opinion that the ideas leading the professional student to the acquisition of a proper attitude toward his social and professional environment may best be acquired by study and contact with qualified instructors in the social sciences, political science, history, psychology, philosophy, languages, and humanities or the fine arts. Sufficient unspecified elective hours should be permitted in the curriculum to permit the student to acquire such contacts.

While serving as President of the American Association of Colleges of Pharmacy, Hugo H. Schaefer referred to one aspect of the college experience which is not ordinarily thought of as contributing to liberal education (47):

> Many argue that this excessive load and lessened activity in general campus affairs is common to all professional schools. This may be so but I believe that a fuller participation in all the non-classroom activities of our educational institutions would be of inestimable value, especially to pharmacy students. . . . They would gain particularly in those qualities which would tend to make them more valuable and important citizens in their communities. Their outlook on life would be broadened and their views and interests encouraged beyond those of the confines of the drug store.

If extracurricular activities can produce the results attributed to them by Dr. Schaefer, then perhaps they too should be brought under the panoply of liberal education.

Liberal education and personal competence. In every period of Western civilization until our own, the cultivation of the individual's intellectual capacities for their own sake has been a principal aim of formal education. But in our present culture with its dominant technological and economic orientation, the habit of pursuing knowledge solely for the sake of what it can do for the individual has given way to externally generated objectives which reflect the requirements of a given occupation and the needs of society.

The literature on pharmaceutical education provides an excellent example of this situation. The journals are rich in materials on methods of teaching the technical aspects of pharmacy; and, as we have just seen, they frequently

contain articles referring to the importance of educating pharmacists for social competence. But clear-cut expressions of concern for the personal enrichment of the individual are notably rare.

The literature from 1900 to 1925 yields no really worth-while statements on this subject. From 1925 to the present, references are sketchy. Nevertheless, a few statements stand out and are worth examining.

Among all pharmaceutical educators, Dr. Frederick J. Wulling probably perceived most clearly the importance of liberal education in the preparation of pharmacists. In 1925 he referred to the capacity of preprofessional liberal studies to produce the qualities of "culture, good taste, devotion to ideas and refinement," and added (48):

> Those who possess [such qualities] live more fully and affirmatively and certainly have the advantage of those who lack them entirely or in degree. Why should not pharmacy enjoy its fullest advantages? I cannot think of a reason unless it be that it fails to recognize them.

In 1938, Hugh C. Muldoon, President of the American Association of Colleges of Pharmacy, drew attention to pharmacy's need for teachers capable of endowing their students with certain essential personal qualities (49):

> Teachers who are products of a profession that until recently has been conditioned by years of attention to the acquiring of facts, may not find it easy to change some of their ideas and methods, but it is important that they do so. They must learn to teach men, not subjects. They must not be satisfied with the development of an aggregation of skills. Education goes beyond mere factual knowledge; it should be a stabilizing influence throughout life. Teachers should be concerned with the attitudes and habits and appreciations of their students as well as with their techniques. They must try to develop the ability of students to think independently and to reason logically.

The 1948 *Findings and Recommendations of the Pharmaceutical Survey* is a rich source of statements on the values of liberal education. At one point the authors touch on the personal needs of pharmacists (50):

> The pharmacist is a person as well as a pharmacist. Like other individuals in modern life, he has many interests outside his professional activities. He needs the enrichment of life that comes from an understanding and appreciation of civilization, and he should develop a personal philosophy of living that is satisfactory to him and makes for a well adjusted life.

The relationship between the personal qualities of individual pharmacists and progress in the profession is brought into sharp focus by Donald C. Brodie of the University of California College of Pharmacy (51):

> One of the great tragedies of our pharmaceutical inheritance is the fact that the pharmacist has been willing to let someone else do much of his thinking for him. This has been one of the significant factors retarding the professional growth in this country. It becomes of paramount importance, therefore, that, as we enter a new growth phase in pharmaceutical education, continued emphasis be placed on those concepts and methods that will encourage creative and independent thinking among students of pharmacy.

This acknowledgement of pharmacy's need for independent thinking should not be allowed to obscure the superb contributions of the small group of pharmacists who have consistently led the way toward more liberal curricula. Nevertheless, much of the creative educational thinking in pharmacy has originated outside the profession with men like Lloyd Blauch and Edward C. Elliott. Perhaps Brodie is right in suggesting that one of pharmacy's most pressing needs is for creative leadership. Perhaps in meeting this need, liberal education can serve its greatest function.

Liberal education and academic efficiency. There is another argument in behalf of liberal education which has been advanced primarily within the past ten years. Those who struggled faithfully for the lengthened pharmaceutical curriculum contended that students would be better able to handle the technical studies of pharmacy if they approached them with a firm background of general or liberal education. In 1953, Melvin Green of the American Council on Pharmaceutical Education phrased the argument this way (52):

> In examining schools with programs based on preprofessional education, certain advantages seem obvious to me: the student demonstrates ability to handle college work for one or two years before he applies for admittance to pharmacy, he has a broader outlook and he is chronologically and intellectually more mature. This means that the professional courses can be, and generally are, placed on a higher plane than in the 4-year program.

Very recently Dean Harold Hewitt made the same point (53):

> With the service courses in the two-three or the one-four curricula in particular sending us better prepared trainees, we can recast our professional courses in the last years of the professional program. Greater maturity, more careful selection of our students, and a better background in preparatory work will permit us to give the added material essential for a modernized version of training.

The above arguments are based on the assumption that the bulk of nonprofessional courses would be given during a period of prepharmaceutical study. For the many schools which operate with integrated programs of liberal and professional studies, the problem is different. Such programs require careful planning to develop curricular sequences which provide optimum interaction between the liberal and technical courses (54):

Liberal education and professional status. In the preceding section it was suggested that one factor which persistently motivated pharmacy to improve its educational standards was its desire to keep pace with the other health professions. The late nineteenth and early twentieth centuries found most of pharmacy's efforts at improvement paralleling medicine's attempts to elevate the quality and quantity of instruction in the sciences. Then, during the second and third decades of this century, medicine rapidly extended its preliminary requirements to make room for additional liberal studies. Since 1945, pharmacy, in its turn, has concentrated on the problem of augmenting the liberal component of its curriculum.

Throughout these developments there has been a pronounced overtone of feeling that the status of pharmacy was closely attached to its willingness to lengthen and broaden its curriculum. As early as 1925, Frederick J. Wulling of the University of Minnesota saw clearly that pharmacy had lost status by allowing its educational program to lag behind those of the other professions (55):

> Only a few decades ago, all who were eligible for entrance upon the pharmacy courses were eligible for medicine, dentistry, law, etc., because there were practically no entrance requirements at all, at least not any really respectable ones in the light of those of today. Pharmacy students in those days were the equal of students in other professions as far as capacity and standing were concerned and similarly the professional pharmacists were on a par with the doctors and lawyers and ahead of the dentists in professional attainment and in the estimation of the public. Why not so today. Why? The answer is obvious. Pharmacy did not advance its entrance requirements in the same degree as other professions did. As a result the best student material ceased going into pharmacy, at least in a large measure, with the consequent gradual lowering of professional ideals and a deterioration of loyalty to the altruistic aims and purposes of the profession. . . .

More recently—at the height of the debate over the five year curriculum—Robert P. Fischelis, Secretary of the American Pharmaceutical Association, urged the members of the Association of American Colleges of Pharmacy to take full cognizance of the effect on pharmacy's prestige of their refusal to adopt an expanded curriculum which would make room for additional liberal studies. Here, too, the "keeping up with the Joneses" theme is prominent (56):

> The other health professions are now on a minimum program which includes pre-professional education at the college level. Pharmaceutical education is, generally speaking, not on such a basis at this time. . . . To establish pharmaceutical education on the proper level with these agencies, it is essential that we be able to show that pre-professional education is a part of the future program of American pharmacy.
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> . . . . . .
>
> I hope therefore, that members of the American Association of Colleges of Pharmacy will give due consideration to the effect of their vote on the longer education program upon government departments, educational agencies and industry. All of these groups, as well as the profession itself, expect pharmaceutical education to keep pace with that of the other health professions.

A year later, Melvin W. Green of the American Council on Pharmaceutical Education repeated Dr. Fischelis' warning, adding, "In many universities, the central administration likewise tends to place pharmacy in a lower category because it is not based on adequate preprofessional education." (57)

There is reason to believe that pharmacy has been motivated to improve its educational standards not only by developments in other professions, but also by the rising educational level of the population as a whole. In 1937, Dean Kendig took this fact into account when he urged the Association to approve an expanded curriculum (58):

> Gentlemen, I am pleading for education for the Pharmacist of the future to be placed on as high a level as that of the average college educated American citizen. Suddenly, under governmental auspices, and unparalleled economic opportunities, over night we will multiply the number of Americans equipped with varying degrees of higher education. Consequently in the future our young people will be forced to our colleges and universities to successfully meet the established intellectual competition, not just for advancement to great heights, but to earn a decent living.
>
> If we base our education on [any] plan which admits students from high school to our professional course, we will freeze their cultural education, their education for citizenship on the present level. We hold a grave responsibility. Let us discharge it by having the courage to plan the pharmacist's general education for the future in harmony with ever changing social, political and economic progress.

In view of these confessions of concern for the status of the profession, it is not surprising that a number of educators felt that pharmacists tended to suffer from inferiority feelings. Some writers expressed the hope that liberal education could help to overcome this state of mind. For example, Dean Harold Hewitt, President of the American Association of Colleges of Pharmacy for 1957, suggested that (59):

> In the development of an appreciation of the arts and humanities, we can aid in breaking down the provincialism that has long developed in our trainees a high incidence of the inferiority complex in the presence of other college graduates.

Other educators were interested in liberal education as a means of preparing practitioners to become leaders of high status in their communities (60):

> Herein lies one of the greatest arguments for the all-around training of those who look to pharmacy as a profession. Not only must he be scientifically and laboriously trained in the technical phases of his profession, he also must possess an all-round education and culture which will fit him to be a leader of men and a leader in his community. A trained pharmacist is one of the greatest assets of any community.

As we might expect, many practicing pharmacists were concerned about the problem of status. In recent years, a few have begun to perceive clearly

that liberal education can be a factor in achieving the higher status they desire. A statement by the president of the American Pharmaceutical Manufacturers Association makes this point clearly (61):

> . . . the pharmacist of the future will need to know more than the sciences and will need to understand economics, the humanities, communication (written and spoken) as well as the arts. He will require a well-rounded education to take his rightful place among the other business and professional men of his community.

These, then, are the kinds of arguments advanced in behalf of liberal education by those concerned with the preparation of pharmacists. Thus far, the term liberal studies has been used primarily to denote the nonscientific, nonprofessional courses in the pharmaceutical curriculum. Before concluding this study, it is necessary to examine the statements of a number of educators who have pointed to the liberalizing capacities of the scientific and technical components of the curriculum.

IV. LIBERALIZING THE PROFESSIONAL CURRICULUM

In order to clarify the following discussion, the author has established a three-part classification of the pharmaceutical curriculum:

A. Technical courses such as dispensing, pharmacology, and drug specialties.

B. Basic professional courses, as, for example, chemistry, physics, economics, and bacteriology.

C. Nontechnical, nonprofessional courses such as philosophy, psychology, sociology, and English literature.

The preceding section was concerned largely with studies classified under group C. These courses are not generally thought of as directly tributary to the study of pharmacy. On the other hand, they are usually credited with the capacity to liberate the student from a narrow view of life and his profession.

The studies which fall in groups A and B have been designated by the author as the "professional curriculum." They are involved in the liberalizing process largely because of the profession's commitment to the idea that technical courses (A) should be undergirded by a broad foundation of basic professional courses (B).

Those who have argued for broader professional studies have pointed out that pharmacists need more comprehensive preparation in the basic sciences and mathematics if they are to keep abreast of new scientific developments. In 1925, Rufus Lyman took this position as he discussed the mechanics of the new three year course (62):

> The pharmacist must not only be trained so that he can render an intelligent pharmaceutical service today but he must be so trained that he can later train himself to practice pharmacy as it must be practiced in the future. . . . The only hope for growth is that we insist upon a broad fundamental training that gives a man a background that will enable him to adapt himself and his service to the everchanging conditions of complex modern life. This must be our one thought in the lengthening of the pharmaceutical curriculum.

Throughout the years, other leaders in pharmaceutical education such as Charles H. Rogers and Troy C. Daniels as well as the Committee on Curriculum of the American Association of Colleges of Pharmacy have repeated this theme in substantially the same language. As recently as 1955, Dr. Melvin Green

suggested some of the implications of the fact that pharmacy graduates of today will practice in a much different world of science in the future (63):

> Obviously within 5 years after graduation, much the pharmacist has learned has become obsolete and he is confronted with a whole new world of facts. It seems to me that the only sound solution is thorough education in the fundamental sciences ancillary to pharmacy. The student must be given an opportunity to know the basic ideas, theories and concepts, not just the facts, in the various branches of chemistry, physiology, bacteriology and other sciences in order that he can read the professional literature of the future with reasonable intelligence.

The idea of liberalizing or broadening the professional component of the curriculum was given a slightly different slant by those concerned with what we might call the "integrity of the profession." They believed that a greater emphasis on the basic sciences would help to establish more emphatically the professional nature of pharmaceutical practice and at the same time protect pharmacy from the incursions of other professions requiring similar scientific preparation. For example, in the 1946 report of the Problems and Plans Committee of the American Association of Colleges of Pharmacy, the authors stated that in order to meet competition from related professions: "We must prepare our students so well in the fundamental sciences that no one without pharmacy training can out-qualify them because of superior knowledge in one of these fundamental sciences." (64)

In 1954, Melvin Gibson expressed still a different view of the value of liberalizing the professional curriculum (65).

> One of the basic concepts which divides a tradesman from a member of a profession is the difference in the complete understanding of activities of the respective vocation. Tradesmen usually have a so-called working knowledge of their craft. The basic understanding of physical and biological laws is lacking. A true professional not only realizes the importance of his functional capacities but also knows all of the biological and physical laws upon which they are based. For many years pharmacy was practiced as a trade, taught as a trade, and—whether we like it or not—was a trade. We are now pulling ourselves (albeit laboriously at times) from this swamp of functionalism into an era of scientific professionalism. . . . I think it behooves each of us to examine the courses we teach and to examine them carefully. How much are we teaching that involves basic laws of general application? How much of it involves the 'glue' that holds information into integrated wholes? How much of it provides a basis for future reference by the student so that when advances in science occur in his lifetime he has been prepared to the best of our ability to evaluate and integrate those advances into his armamentarium of knowledge?

Those who advocated a broader professional curriculum did not confine themselves to advocating more substantial offerings in the basic sciences. At various times during the past thirty years, pharmaceutical educators have attested to the importance of such essentially professional studies as the history of pharmacy and business methods. As early as 1927, one author pointed to the history of pharmacy as a source of culture and of professional consciousness (66).

Some ten years later, Charles O. Lee delivered a speech before the American Pharmaceutical Association titled, "Discovering Pharmacy Through History." At one point he said (67):

> We need first of all to become thoroughly professionally minded. This will be accomplished, in part at least, by becoming imbued with the idea that the lessons of pharmaceutical history, and its traditions, are of value. With a true historical picture of our profession at hand we should be able to go forward with intelligence, interest and enthusiasm.

Of course, in recent years the history of pharmacy movement has enjoyed the forceful leadership of George Urdang and Glenn Sonnedecker of the University of Wisconsin who have published numerous articles on the importance of offering courses in this area.

As we suggested earlier, pharmacists have long been concerned over the fact that in their practice they are both businessmen and scientists. Recently, there has been considerable interest in what constitutes adequate preparation for the commercial responsibilities of the pharmacist. One writer, for example, recommended three basic types of business courses: accounting, store management, and marketing (68). This recommendation and those above concerning the history of pharmacy are further examples of the profession's commitment to the idea that the technical component of the curriculum should be supported by a broad foundation of basic-professional courses.

An examination of the curricula of a representative sample of colleges of pharmacy* shows that pharmaceutical educators have done more than talk about liberalizing the professional curriculum. On the average, pharmacy students today devote 50 per cent of their time to technical studies. This work is supported by such basic professional courses as biology, chemistry, physics, physiology, and mathematics which amount to another 40 per cent of the total curriculum. While this distribution of time hardly allows for sufficient attention to the nonprofessional aspects of the pharmacist's education, it does suggest that, within the professional curriculum, the technical courses are sustained by a broad foundation of basic studies.

V. CONCLUSION

Through the years, a small but significant group of pharmaceutical educators has consistently advocated that nonprofessional liberal studies be given a larger role in the preparation of pharmacists. Nevertheless, a look at present-day practices in pharmaceutical education makes it clear that the profession has a long road to travel before the curriculum will reflect adequately the ideals expressed in these pages.

While it is true that the colleges of pharmacy have added to their curricula numerous courses in the basic sciences and mathematics, they have not made sufficient room for the humanities and the social sciences. Today, the average college of pharmacy devotes approximately 90 per cent of its curriculum to courses which are either technical in nature or basic preparation for technical studies. Thus, only 10 per cent of the curriculum is free to provide students with those nonprofessional liberal studies which pharmacy's greatest educators have said are crucial in determining the status of the profession.

The "liberal arts" label provides no clear assurance that a given course will be liberalizing in the broad, nonprofessional sense. For example, a course in qualitative analysis may be very effective in broadening the education of a student majoring in English literature, but the same course for the prospective pharmacist is clearly a part of his professional preparation and, therefore, liberalizing only in a limited way. Thus, the problem of preparing liberally educated pharmacists cannot be solved solely by adding to the curriculum "liberal arts" courses in science and economics. Instead, curriculum planners must evolve schedules for their students which not only provide broad technical preparation but which also take full cognizance of the vital function of the humanities and the social sciences in preparing pharmacists who are professional men in the fullest sense of the word.

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*The percentages which appear here and in the conclusion were derived from an analysis by the author of the curricula of twenty-five representative colleges of pharmacy.

This point of view has been expressed frequently by educational experts outside the profession. But the fact remains that only those within the profession who are thoroughly familiar with its problems can perform the complex and difficult task of curriculum revision which will be necessary to improve the status of pharmacy.

Pharmacy is in the enviable position of being able, within the next two or three years, to make significant adjustments in its educational program. The advent of the five year plan provides a golden opportunity. As faculty committees all over the nation re-examine their curricula, they should keep in mind that the future of the profession may well be determined by the decisions they make regarding the role to be played by liberal studies in the preparation of tomorrow's pharmacists.

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The oldest pharmaceutical manufacturing establishments in the United States had their origin in retail pharmacies.

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LIBERAL EDUCATION AND AMERICAN PHARMACY, A BIBLIOGRAPHY

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INTRODUCTION

This bibliography has been compiled as a means of studying the development of the ideal of liberal education in the preparation of pharmacists.

In using this material, the reader should keep two things in mind. First, these references have been selected to include those which refer specifically to the place of liberal (nontechnical) studies in the pharmaceutical curriculum. A few items of more general import have been included as a source of background information.

Secondly, the annotations are not necessarily designed to characterize the entire reference to which they are attached; rather, they refer only to the sections of the article which are concerned with liberal education.

The author is grateful for the assistance rendered by the staffs of the libraries of the New York Academy of Medicine and the College of Physicians and Surgeons, Columbia University.

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   A statement by the Dean of the Duquesne University School of Pharmacy concerning the place of liberal education in the new five year program. Dean Adams says, " . . . we were not primarily launched on a program to improve professional aspects of the curriculum . . . but were intent on providing a practitioner of the professions with a broad cultural background in areas which are collectively referred to as general education . . . "

*2. **Alpers, William C.** "Preliminary Education for Students of Colleges of Pharmacy," *Pharmaceutical Era,* 23:550-552, May 24, 1900.
   One of the best of the early statements about the value of liberal education for the pharmacist. Lamenting the low status of the profession, the author asserts that one remedy is for the colleges to raise their preliminary requirements so that students will experience at least a full high school education before beginning their specialized training.

3. **Anderson, G. Lester.** "The University and Professional Education," *American Journal of Pharmaceutical Education,* 15:500-513, October, 1951.
   The Dean of Administration at the University of Buffalo points to the unique social role of the pharmacist who is both businessman and professional person. He suggests that a liberal education can help to prevent these two roles from coming into conflict.

*Items marked with an asterisk (*) are especially significant.

4. **Baker, Newton D.** "What the Pharmaceutical Teacher Should Teach," *American Journal of Pharmaceutical Education,* 1:233-235, April, 1937.
An article written by the Secretary of War in about 1917 and reprinted in the *Journal.* The author discusses the social responsibilities of the pharmacist and asserts that only " . . . contact with liberal and enlightening things . . . " rather than a narrow technical education will equip him to cope with these responsibilities.

5. **Bartley, E. H.** "Accessory Pharmaceutical Education," *Proceedings of the American Pharmaceutical Association at Forty-Sixth Annual Meeting,* 1898. Pp. 526-531.
The author bemoans the fact that it is possible to become a licensed pharmacist without ever attending a college of pharmacy. Because of this, colleges of pharmacy are prevented from expanding their programs beyond the hard core of technical studies to include the accessory knowledge which a pharmacist needs to perform his job more effectively. A good example of the turn-of-the-century interest in enlarging the scope of pharmacy education.

6. **Blauch, Lloyd E.** "The Earmarks of a Profession," *American Journal of Pharmaceutical Education,* 12:243-255, April, 1948.
The Assistant Director of the Pharmaceutical Survey describes the nature of a profession with special reference to pharmacy and dentistry. He emphasizes the importance of general education as an identifying characteristic of the professional man.

*7. ————. "General Education," *American Journal of Pharmaceutical Education,* 13:448-454, July, 1949.
The Associate Chief for Education in the Health Professions in the U.S. Office of Education declares that pharmaceutical education has many shortcomings but " . . . none which are so serious as the meagre attention you give to general education." Blauch urges that pharmacists look upon general education not as a "mere frill," but rather as an essential in the education of any person who will render professional services to society.

8. ————. "Pharmaceutical Education and Its Adequacy, or Inadequacy, in Preparing a Graduate for the Many Diversified Careers in Pharmacy," *American Journal of Pharmacy,* 125:222-232, July, 1953.
The author discusses the wide variety of positions open to the graduate pharmacist and lists the various components of the curriculum which help to prepare him for such positions. Blauch places considerable emphasis upon those subjects which enable the pharmacist to discharge his civic and social responsibilities and to live a balanced and satisfying personal life.

9. ————. "Some Problems of Pharmaceutical Education," *American Journal of Pharmaceutical Education,* 13:455-468, July, 1949.
The author of the section on curriculum of the Pharmaceutical Survey takes the position that the ideal of a broad professional education should include not only general education but also broadly conceived technical studies. The pharmacist must practice his profession with an understanding of the social, psychological, and cultural implications of that practice.

10. ————. "The Survey Has Looked at the Pharmaceutical Curriculum," *American Journal of Pharmaceutical Education,* 12:677-698, October, 1948.
A preview of the book later published under the title, *The Pharmaceutical Curriculum.* The author discusses the responsibilities of the pharmacist to himself and to society, and then lists four compelling arguments for giving general education a larger place in the preparation of pharmacists.

*11. ———— **and George L. Webster.** *The Pharmaceutical Curriculum.* Washington: American Council on Education, 1952. 257 pp.
The most thorough and influential study of the pharmacy curriculum available in 1958. This book is an expansion of one section of the well-known Pharmaceutical Survey, 1946-49. It contains an extensive statement on the importance of general or liberal education in the preparation of pharmacists.

12. **Brady, Edward S.** "The Six Year Program: A Progress Report," *American Journal of Pharmaceutical Education,* 17:448-454, July, 1953.
A professor of pharmacy surveys the plan and operation of the University of Southern California's six year program which went into operation in 1950. He points to a more logical flow of courses from the theoretical to the practical and to the increased prestige which the school of pharmacy enjoys in the University community.

13. **Brodie, Donald C. and Sidney Riegelman.** "The Terminal Course in Pharmacy," *American Journal of Pharmaceutical Education,* 14:565-571, October, 1950.
The authors deplore the lack of creative thinking among students of pharmacy. They recommend that creativity be encouraged by enabling students to enter into research projects during their undergraduate years.

14. **Busse, Louis W.** "The Five Year Pharmacy Curriculum," *South Dakota Journal of Medicine and Pharmacy,* 9:224-228, June, 1956.
A thoughtful article which argues that a pharmacist must be prepared to render service to his customers, to the physician, and to the general public. To provide an education broad enough to encompass these functions, the author recommends that there be a two year prepharmacy college requirement.

15. **Charters, W. W., A. B. Lemon and Leon M. Monell.** *Basic Material for a Pharmaceutical Curriculum.* New York: McGraw-Hill, 1927. 366 pp.
An attempt to derive an up-to-date pharmacy curriculum by studying objectively the practice of pharmacy in drugstores throughout the United States. In the beginning paragraphs, the authors bow perfunctorily to "cultural" education, but they rule it out as part of their study. The attitude here is in interesting contrast to the emphasis on general education which is an important part of the 1946-49 Pharmaceutical Survey.

*16. **Committee on the Pharmaceutical Survey.** *Findings and Recommendations of the Pharmaceutical Survey, 1948.* Washington: American Council on Education, 1948. 49 pp.
The summary report of the Pharmaceutical Survey which presents in brief compass all of the major conclusions which are spelled out

in much more detail in the compendious *General Report of the Pharmaceutical Survey 1946-49*. The sections titled "The Pharmacist and His Services" and "General Education" are of special interest to the student of liberal education.

17. **Connor, John B.** "What Economics Offers to the Pharmacy Curriculum," *American Journal of Pharmaceutical Education*, 4:261-267, April, 1940.
An example of interest in broadening the professional curriculum in pharmacy. By becoming familiar with the theory and practice of economics, the pharmacist can become a more effective practitioner.

18. **Crossen, George E.** "Education vs. Training in Pharmacy," *American Journal of Pharmaceutical Education*, 11:255-257, April, 1947.
The author laments the tendency of pharmacy schools to allow technical studies to crowd general education out of the curriculum. He believes that if students are to realize their fullest capabilities as pharmacists, they must have the benefit of at least two years of liberal studies.

19. **Daniels, Troy C.** "Report of the President," *American Journal of Pharmaceutical Education*, 17:515-524, October, 1953.
In a lively and constructive report, the Dean of the University of California College of Pharmacy deplores the unwillingness of the American Association of Colleges of Pharmacy to expand the curriculum to either five or six years, including two years of pre-pharmacy studies. One of the chief advantages of the expanded program would be to provide the student with knowledge and understanding necessary to deal effectively with the culture in which he lives and practices.

20. **Eiler, J. J.** "The Education of Pharmacists," *American Journal of Pharmaceutical Education*, 19:296-298, Spring, 1955.
A brief article in which the author concludes that the recent interest of pharmaceutical educators in general education is long past due. He suggests perceptively that those who have opposed the expanded program have made their judgments on the basis of circumstances which now exist in pharmacy rather than according to what will be demanded of the pharmacist in the future.

*21. **Elliott, Edward C.** *The General Report of the Pharmaceutical Survey, 1946-49*. Washington: American Council on Education, 1950. 234 pp.
The most thorough picture of modern pharmacy and pharmaceutical education available today. Especially valuable as a source of information concerning the data from which grew the findings and recommendations of the Survey.

22. ———. "The Professional as a Person," *American Journal of Pharmaceutical Education*, 10:442-448, October, 1946.
At the outset of the Pharmaceutical Survey, its Director presents a clear-cut statement of the value of liberal education for the pharmacist. Elliott suggests, among other things, that pharmacy is by nature a specialty, and that the pharmacist risks being completely absorbed by his professional efforts unless he has a solid background of liberal education to make him aware of the importance of functioning as a whole man.

23. **Fischelis, Robert C.** "To Be Or Not To Be," *American Journal of Pharmaceutical Education,* 13:271-275, April, 1949.
The Secretary of the American Pharmaceutical Association points to the function of liberal education as a means of assuring that professional people, throughout their lives, will be able to understand the changing character of the problems which confront society and the changing means available for solving them. In conclusion the author says, "The American Association of Colleges of Pharmacy must answer and answer soon the question whether this pharmacist of the future is to be or not to be a mere technician or an educated professional man or woman."

24. **Fishbein, Morris.** "Medical and Pharmaceutical Education," *American Journal of Pharmaceutical Education,* 5:462-473, October, 1941.
The Editor of the *Journal of the American Medical Association* describes the achievements of medicine in the field of liberal education and suggests that pharmacy follow suit. He recommends that "cultural" studies be relegated to a preprofessional program in order to make room in the professional curriculum for certain professionally oriented courses in the areas of sociology, economics, and psychology.

25. **Francis, John M.** "Higher Education for the Pharmacists," *Bulletin of Pharmacy,* 8:12-14, January, 1894.
An argument for more thorough preparation in the sciences for pharmacists. The article reflects the growing susceptibility of educators in pharmacy to the pressure of the new scientific knowledge which appeared in the later nineteenth century.

26. **Gibson, Melvin R.** "Educators of the Future," *American Journal of Pharmaceutical Education,* 18:447-453, July, 1954.
The future editor of the *American Journal of Pharmaceutical Education* says that pharmacists must pull themselves "from this swamp of functionalism into an era of scientific professionalism." One way to accomplish this is to liberalize the professional curriculum by emphasizing "basic laws of general application," rather than the mere techniques of pharmaceutical practice.

27. **Green, Melvin W.** "Pharmaceutical Education and the Wisconsin Idea," *American Journal of Pharmacy,* 127:408-416, December, 1955.
A thoughtful address by the Director of Educational Relations, American Council on Pharmaceutical Education, who recommends that the educational base of the pharmacist be broadened until he is able to perceive himself and his practice in the context of his total environment. He recommends that the pharmaceutical curriculum be concerned with basic ideas and theories, not merely with facts, so that the pharmacist will be able to deal intelligently with future developments in his field.

28. ———. "Recent Progress in Pharmaceutical Education," *American Journal of Pharmaceutical Education,* 17:541-551, October, 1953.
Having just completed a series of accreditation visits to colleges of pharmacy, the author observes that colleges which require a period of preprofessional studies seem to enjoy higher prestige in the univer-

sity family and in the community. Not only do the students in these institutions benefit because of their broader general education, but also, the professional courses are likely to be taught on a higher plane because the students are more carefully selected and the entire four years is devoted to professional or semiprofessional courses.

29. **Hardt, Robert A.** "Pharmacy Is Worth Fighting For," *American Journal of Pharmaceutical Education,* 19:459-466, Summer, 1955.
The President of the American Pharmaceutical Manufacturers Association discusses the many functions which a practicing pharmacist must perform. Although he proposes no specific curriculum, he does state unequivocally that the pharmacist " . . . will require a well-rounded education to take his rightful place among the other business and professional men of his community."

30. **Hayman, J. Lester.** "The Address of the President," *American Journal of Pharmaceutical Education,* 13:432-439, July, 1949.
An outgoing President of the American Association of Colleges of Pharmacy epitomizes two of the chief reactions to the Pharmaceutical Survey, the one favoring a more thorough cultural education, and the other advocating an emphasis on technical knowledge with only as many cultural subjects as may be conveniently worked into the existing four year program.

*31. **Hewitt, Harold G.** "Pharmacy Unlimited," *American Journal of Pharmaceutical Education,* 21:193-203, Summer, 1957.
The 1957 President of the American Association of Colleges of Pharmacy frowns upon the tendency of some colleges to use the extra year of the new five year program for additional professional subjects. He asserts that those who advocated the expanded program saw it as a means of producing graduates who could enjoy higher status and greater personal and social competence as a result of increased liberal education.

32. **Hill, James S.** "Pharmacy at the Crossroads," *American Journal of Pharmaceutical Education,* 12:403-411, July, 1948.
A retail pharmacist lends his support to the idea of a broad program of education in pharmacy which will enable the practitioner to " . . . continue to progress and educate himself in his chosen field . . . "

33. "How Far Is Pharmacy Entitled To Rank as a Profession?" *Proceedings of the American Pharmaceutical Association at the Sixteenth Annual Meeting,* 1868. Pp. 81-85.
In an early symposium, Edward Parrish, President of the A.Ph.A. rises above the usual level of thinking at this time by advocating that aspiring pharmacists be required to come to the colleges of pharmacy with a " . . . liberal, thorough education."—meaning, in 1868, a four year high school education.

34. **Huested, A. B.** "Pharmaceutical Education," *The Medical Annals,* 5:294-303, October, 1884.
The author colorfully suggests that pharmaceutical education is in a state of transition, being "neither hawk nor buzzard." He predicts that there will be an increasing emphasis on the theoretical aspects of pharmacy which can be learned only in a professional school.

35. **Jenkins, Glenn L.** "The President's Address," *American Journal of Pharmaceutical Education,* 10:410-427, October, 1946.
One of the topics in this presidential address relates to the establishment of the five year program which, the author suggests, would enable pharmacy students to exercise leadership more effectively and to enjoy more fruitful inter-professional, community, national, and international relationships.

36. ———. "The President's Page," *American Journal of Pharmaceutical Education,* 9:413-420, July, 1945.
At the end of World War II, the President of the American Association of Colleges of Pharmacy looks to the future and perceives clearly the importance of liberal education in the preparation of pharmacists. He asserts that students should receive their general or liberal education on the secondary level. Since this does not occur, it is necessary for the colleges of pharmacy to provide liberal studies. He urges that these studies be available on an elective basis so that students may select their nontechnical studies according to their own needs.

37. **Kanig, Joseph L. and Leonard T. Chavkin.** "The Need for Education Training for Teachers in Colleges of Pharmacy," *American Journal of Pharmaceutical Education,* 16:369-374, July, 1952.
Two professors at the Columbia University College of Pharmacy focus upon a special role of liberal education in the preparation of pharmacists, which is to provide teachers of pharmacy who are technically competent and at the same time capable of giving their students a broad view of the profession and of life.

38. **Kendig, H. Evert.** "Address of the President of the American Association of Colleges of Pharmacy," *American Journal of Pharmaceutical Education,* 5:451-462, October, 1941.
In the final days before Pearl Harbor, the Dean of the Temple University School of Pharmacy declares that whereas colleges of pharmacy are doing an adequate job of technical preparation, they are lagging seriously behind the other health professions in the humanities and the social sciences. He urges pharmaceutical educators to plan actively for an educational program which will remedy these deficiencies so that pharmacy can face the coming period of readjustment with confidence.

39. ———. "Pharmaceutical Education for the Future," *American Journal of Pharmaceutical Education,* 11:33-43, January, 1947.
The Dean of the Temple University School of Pharmacy affirms his faith in preprofessional education as a means of bringing pharmacy to a status comparable to the other health professions. He asserts that recent developments in science have made it necessary to devote four full years to the technical education of the pharmacist. Consequently, if pharmacy students are to have the benefit of liberal studies, they must pursue them during a two year prepharmacy college program.

*40. **Kraemer, Henry.** "University Instruction in Pharmacy," *Pharmaceutical Era,* 51:13-15, January, 1918.
A review of university instruction in pharmacy since 1868 when it was first established in the United States at the University of Michi-

gan. Although the article does not focus specifically on liberal education, it is a valuable source of background information concerning the growth of pharmacy as an academic discipline.

41. **Kremers, Edward.** "The College of Pharmacy," *Pharmaceutical Review,* 24:129-141, May, 1906.
One of the great leaders in pharmaceutical education traces briefly some of the European influences on early American pharmacy and then dwells at some length upon the inability of the nineteenth-century proprietary schools of pharmacy to maintain high standards because of their dependence on the practicing pharmacists who operated the schools.

*42. ———. "The State Universities and Pharmaceutical Education," *Proceedings of the Fourth Annual Meeting of the American Conference of Pharmaceutical Faculties,* 1903. Pp. 4-17.
The President of the Conference discusses the increasing role of the state universities in pharmacy education and then proposes that pharmaceutical educators give more attention to the scientific method and the history of pharmacy as opposed to learning based on "a rule of thumb."

*43. ——— **and George Urdang.** *History of Pharmacy.* Philadelphia: J. B. Lippincott, 1951. 622 pp.
The most thorough and useful history of pharmacy available at the present time. The authors direct their attention to the early backgrounds of pharmacy in the Old World, the rise of professional pharmacy in Europe, and to the history of pharmacy in the United States.

44. **Lee, Charles O.** "Pharmacy and the New Education," *Journal of the American Pharmaceutical Association,* 9:1075-1079, November, 1920.
Reflecting the influence of the progressive education movement, a professor of pharmacy at Purdue makes a series of recommendations for liberalizing pharmaceutical education which would lift the study of pharmacy above its narrow technical implications and carry students into broader experiences and understandings. The article displays a commitment to liberal education which is hardly typical of this period in the history of pharmaceutical education.

45. **Long, Eli H.** "The Present Status of Pharmacy and Its Possible Improvement," *Medical News,* 74:423-426, April 8, 1899.
A professor of materia medica at the University of Buffalo discusses the low status of pharmacy which he attributes to the commercial spirit which dominates the profession. To remedy this situation, the author recommends broadening the technical education of the pharmacist and introducing a modicum of nontechnical courses into the curriculum. He also points out that before the colleges can go very far in this direction, the states must pass laws requiring aspiring pharmacists to be graduates of colleges of pharmacy before becoming eligible for licensure.

46. **Lyman, Rufus A.** "A Three Year Course in Pharmacy," *Journal of the American Pharmaceutical Association,* 14:632-634, July, 1925.

Writing at the time the three year pharmacy curriculum went into effect, the future editor of the *American Journal of Pharmaceutical Education* warns the schools that they must use the additional year to liberalize rather than to intensify the program of studies. If this is done, students will be able to keep up with future developments both within the profession and in the world at large.

47. ———. "The Editor's Page," *American Journal of Pharmaceutical Education,* 5:608-611, October, 1941.
The author laments the lack of self-esteem which he believes characterizes pharmacists. One way to remedy this situation is to give students of pharmacy a broader view of the historical accomplishments of the profession. This is by way of expressing approbation for the recent establishment of the American Institute of the History of Pharmacy at the University of Wisconsin.

48. ———. "The Editor's Page," *American Journal of Pharmaceutical Education,* 12:334-336, April, 1948.
The Editor encourages the colleges of pharmacy to look to the liberal arts colleges for their nontechnical courses. He feels that students who have had a sufficient taste of liberal studies will develop qualities which will be highly valuable to them as they meet their customers and the public in general.

49. ———. "The Editor's Page," *American Journal of Pharmaceutical Education,* 13:187-192, January, 1949.
Dr. Lyman expresses his agreement with the Pharmaceutical Survey that the four year curriculum cannot provide students with sufficient basic cultural courses to enable them to cope with the problems of citizenship. He advocates a five or six year curriculum in which liberal courses are integrated with professional studies.

50. ———. "The Editor's Page," *American Journal of Pharmaceutical Education,* 16:302-308, April, 1952.
Dr. Lyman refers to a plea made by Robert P. Fischelis, Secretary of the American Pharmaceutical Association, in behalf of the prompt extension of pharmaceutical education to include two years of liberal studies. The author quotes Dr. Fischelis as saying that the Association of Colleges of Pharmacy must be aware of the negative effect of refusing to extend pharmaceutical education, upon government departments, educational agencies, and industry.

*51. **McGrath, Earl J.** "The Organization of the Pharmacy Curriculum," *American Journal of Pharmaceutical Education,* 13:127-140, January, 1949.
The Dean of the College of Liberal Arts at the State University of Iowa argues strongly in favor of liberal education in the pharmaceutical curriculum. He points out, " . . . that the fields of knowledge and the range of subject matter considered basic to the successful practice of pharmacy is now vastly greater than it was a quarter century ago." The final paragraphs of the article are devoted to an argument in favor of integrating liberal studies throughout the professional curriculum as opposed to segregating them in a preprofessional period.

52. **Maynard, H. H.** "The Place of Business Administration Subjects in the Pharmacy Curriculum," *American Journal of Pharmaceutical Education*, 7:341-346, July, 1943.
Recognizing the dual role of the pharmacist as both professional man and merchant, the author proposes that competence in business matters not be left to chance, but that courses be instituted to assure such competence.

53. **Muldoon, Hugh C.** "Address of the President of the American Association of Colleges of Pharmacy at Minneapolis, August 22, 1938," *American Journal of Pharmaceutical Education*, 2:466-477, October, 1938.
In one section of his address, the Dean of the School of Pharmacy at Duquesne University discusses the vital role of teachers in promoting liberal education in schools of pharmacy. He suggests that in pharmacy it is especially difficult to find liberally oriented teachers because until recently the profession has emphasized the acquiring of facts rather than broad, fundamental concepts.

54. ———. "The Strengths of Pharmacy," *American Journal of Pharmaceutical Education*, 18:11-30, January, 1954.
In an address delivered upon receiving the Remington Medal, the Dean of Pharmacy at Duquesne proclaims the innate liberality of the pharmaceutical curriculum. He says with regard to the study of pharmacy, "Every subject in it, when properly taught has cultural value." Hence it is not necessary to expand the period of study to five or six years to make room for additional liberal education.

55. **Orr, Jack E., Hugo Schaefer, Warren E. Weaver and John F. McCloskey.** "Planning the Extended Program," *American Journal of Pharmaceutical Education*, 19:652-673, Fall, 1955.
A group of pharmacy educators discuss the problems incident to implementing the new five year curriculum. Repeating some of the same caveats which were issued when the four year program went into effect, they urge that the fifth year be used to re-emphasize basic principles and to offer additional nontechnical studies.

56. **Osborne, George E.** "The Integration of Liberal Arts and Professional Courses in the Five Year Program," Speech delivered before the joint meeting of the American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy, Districts 7 and 8, November 3, 1955.
A professor of pharmacy at the University of Utah recommends that students be given courses which are "liberal in content," but which are limited strictly to pharmaceutical origins. He concludes that this would produce a curriculum which would have the distinction of being " . . . bounded by horizons that are strictly pharmaceutical."

*57. **Parrish, Edward.** "The Preliminary Education of Apprentices," *Proceedings of the American Pharmaceutical Association at the Twentieth Annual Meeting*, 1872. Pp. 173-178.
A past president of the American Pharmaceutical Association makes a realistic plea for additional preliminary education for students of pharmacy. He recognizes that since most pharmacists are drawn from

the middle class, they cannot afford the luxury of a liberal arts education. Nevertheless, he feels that aspiring pharmacists should go as far as they can in liberal studies before beginning their professional education. He warns that " . . . pharmacy never will take rank with the medical profession till it has within its ranks a considerable portion of well-educated, cultured men."

58. "The Pharmacist as an Educational Influence," *American Journal of Pharmaceutical Education,* 3:127, January, 1939.
A brief item which argues that a pharmacist must not only be scientifically trained in the technical phases of his profession, but that he must also be broadly prepared to function as a leader in his community.

59. **Phelan, Paul J.** "English in the Pharmacy College," *American Journal of Pharmaceutical Education,* 4:608-611, October, 1940.
The author perceives a direct connection between professional status and competence in the skills and understandings usually associated with the study of English.

60. **Reese, J. Allen.** "Installation Address,"*American Journal of Pharmaceutical Education,* 15:493-499, October, 1951.
The Dean of the University of Kansas College of Pharmacy takes a firm stand in behalf of a five year pharmacy program which would provide two years of liberal studies and three years of professional work. He advances the interesting opinion that practicing pharmacists have opposed the extended program because they thought the additional year was to be used for further technical studies. He feels that the profession would not oppose the expanded program if it understood that the extra time was to be devoted to general education.

*61. **Remington, Joseph P.** "On the College Training of Students in Pharmacy," *Proceedings of the American Pharmaceutical Association at the Thirty-Seventh Annual Meeting,* 1889, pp. 285-288.
The man who was to become the renowned Dean of the Philadelphia College of Pharmacy tussles with the apprenticeship problem which at this time was a serious obstacle to adequate college programs in pharmacy.

62. "Report of the Committee Appointed to Study the Question of Fixing a Definite Date for the Adoption of the Four-Year Minimum Course," *Proceedings of the Twenty-Eighth Annual Meeting, American Association of Colleges of Pharmacy,* 1927, pp. 67-81.
A report on a questionnaire study which asked, among other things, "What benefit would pharmacy derive from a four year course?" The answers provide an interesting insight into the values, positive and negative, which the deans of pharmacy associated with the broader, expanded curriculum.

63. "Report of the Committee To Consider What Cultural Subjects Should Be Added to the Pharmacy Curriculum," *Proceedings of the Twenty-Fifth Annual Meeting of the American Conference of Pharmaceutical Faculties,* 1924, pp. 89-91.
This report is remarkably similar to the subsequent reports made at the time both the four year and the five year curricula were adopted.

It reflects an almost naive faith that the addition of one year to the curriculum will radically change the situation in pharmacy. The committee recommends that certain basic science courses be added and that cultural subjects be given a prominent place in the new curriculum.

*64. "Report of the Committee on Curriculum," *American Journal of Pharmaceutical Education,* 12:765-782, October, 1948.
A crucial report by an important committee of the American Association of Colleges of Pharmacy which gives full support to the ideas on curriculum revision proposed by the Pharmaceutical Survey. A central feature of the report is its strong advocacy of a substantial increase in liberal studies to be achieved by the addition of two years to the existing four year curriculum.

*65. "Report of the Committee on Curriculum," *American Journal of Pharmaceutical Education,* 13:489-507, July, 1949.
Another of the American Association of Colleges of Pharmacy Committee on Curriculum reports which reflects clearly the influence of the Pharmaceutical Survey. Much of the report is devoted to refuting the contention that the four year curriculum can be improved and thus serve adequately the needs of pharmaceutical education. At this time, the committee was fully in favor of the six year curriculum and had not yet begun to accept the inevitability of a compromise five year program.

66. "Report of the Committee on Curriculum," *American Journal of Pharmaceutical Education,* 14:438-449, July, 1950.
A report devoted largely to assessing the possibilities of a five year program in pharmacy. The committee admits grudgingly that the Association may have to be satisfied with an interim five year plan, but insists that in the long run only a six year program consisting of four years of professional studies and two years of preliminary liberal studies will meet the needs of pharmacy.

67. "Report of the Committee on Curriculum," *American Journal of Pharmaceutical Education,* 16:576-581, October, 1951.
This report follows the first defeat of the five year curriculum proposal. The committee devotes itself to a discussion of the advantages to pharmacy of the liberal studies which could be added to the program if the five year proposal were accepted.

68. "Report of the Committee on Curriculum," *American Journal of Pharmaceutical Education,* 17:628-646, October, 1953.
The committee refers to the continuing refusal of the Association to accept the idea of prepharmaceutical studies. They emphasize that it is not possible to make significant improvements in the curriculum within the limitation of a four year program. They go on to assert that if the colleges of pharmacy are to give their students the ability to deal effectively with new developments in pharmacy, they must begin now to offer them a more extensive curriculum.

69. "Report of the Problems and Plans Committee," *American Journal of Pharmaceutical Education,* 7:501-508, October, 1943.
A report reflecting the problems, experienced by pharmacy during World War II, related to obtaining adequate recognition as a profes-

sion. In response to a War Manpower Commission suggestion that pharmacy condense its curriculum to two years for the duration, the Committee protests, saying that the Commission does not seem to understand the dependence of professional training upon a broad, cultural background—which could not be given in a reduced program.

*70. **Rogers, Charles H.** "Flexible Curricula in Colleges of Pharmacy," *American Journal of Pharmaceutical Education,* 3:53-59, January, 1939.
A dean of pharmacy recommends that flexibility be brought to the pharmaceutical curriculum by a broad program of elective studies. He hastens to point out, however, that it will be difficult to obtain flexibility within the context of the present four year program since an overwhelming proportion of the time available must be devoted to technical subjects. The situation, he feels, would be greatly eased in a five or six year program.

*71. **Rudd, Wortley F. and P. F. Fackenthall.** *Pharmaceutical Education.* Bureau of Education, U.S. Department of the Interior, Bulletin No. 11. Washington: Government Printing Office, 1921. 15 pp.
An excellent, though brief, history of the development of pharmaceutical education in the later nineteenth and early twentieth centuries written by men whose orientation is strongly in the direction of university education. The authors pick out those crucial developments which led to the raising of standards, to bringing the colleges into the universities, and to improving the professional status of pharmacists.

*72. **Sanders, Jennings B.** *General and Liberal Educational Content of Professional Curricula: Pharmacy.* U.S. Office of Education, Pamphlet No. 113. Washington: Government Printing Office, 1954. 11 pp.
A statistical study of pharmacy curricula designed primarily as a tool to assist the colleges in formulating their new five year programs. The study produces two conclusions of special note: first, that in the present four year program about 15 per cent of the curriculum, on the average, is devoted to nontechnical subjects; and second, that the adoption of the five year curriculum will not *per se* provide pharmacists with the liberal education they need, for truly effective liberal education programs will arise only out of a deep-seated conviction on the part of pharmacy faculties that such education is important.

73. **Schaefer, Hugo H.** "The Immediate Years Ahead," *American Journal of Pharmaceutical Education,* 15:388-393, July, 1951.
The 1951 President of the American Association of Colleges of Pharmacy mentions the positive position taken in recent years by the state boards of pharmacy with respect to establishing more rigorous educational requirements.

74. ————."Installation Address," *American Journal of Pharmaceutical Education,* 14:389-400, July, 1950.
In one section of his presidential address, the Dean of the Brooklyn College of Pharmacy asserts that the expanded five or six year curriculum, in addition to other advantages, would allow students more opportunity to enjoy the liberalizing effects of nonclassroom activities.

*75. **Schneider, Albert.** "The Appreciable Advantages of Higher and Uniform Entrance Requirements to Colleges of Pharmacy," *Proceedings of the American Pharmaceutical Association at the Fifty-Second Annual Meeting,* 1904. Pp. 127-129.

A statement—rare at this time—concerning the value of a liberal college education as a means of eliminating intellectual narrowness and of generating in the pharmacist a sense of civic responsibility and a desire to serve his fellow men.

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A carefully worked out series of arguments for improving educational standards in pharmacy. At a time when pharmaceutical education encompassed only two years, Wulling was arguing for a four year curriculum which would provide for " . . . some academic and cultural work above and beyond the standard high school education."

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ARTICLES

THE INTEGRATION OF LIBERAL AND PROFESSIONAL COURSES IN PHARMACY*

GEORGE E. OSBORNE

If, for the purposes of this paper, the phrase *liberal courses* is considered to be synonymous with *general education courses*, the discussion of the integration of such material into the programs of colleges of pharmacy can be made fairly generally inclusive. Whatever the name, most colleges of pharmacy aim at some sort of liberal education for their graduates.

> General education is at once the broad base and an integral part of the essential content of both liberal and professional education. It is concerned with the major fields of knowledge, with basic physical and intellectual skills, with fundamental attitudes and values, physical, emotional, and mental well being, and with personal and social relationships. In all these concerns it has one purpose: to help men and women to live mature and rewarding personal lives and to act as informed, useful, and responsible citizens in our democratic society.
>
> . . .
>
> The subjects . . . fall into seven general areas: *communication*—writing, reading, speaking, and listening skills;
> the *physical sciences*—man's understanding and mastery of his inanimate environment;
> the *biological sciences*—man's organized knowledge of the living world;
> the *humanities*—the creative achievements of man in philosophy, art, literature, and music;
> the *social sciences*—man's concern with himself as an individual and as a member of an organized society;
> *personal and family living;* and
> *health, physical education, and military science* (1).

Of all these categories, the pharmacy student finds himself concerned consciously with courses chiefly in the areas of the humanities and the social sciences. His communication and health, physical education, and military science requirements are so traditional that they are accepted cheerfully and worked off early in the freshman year; by virtue of the sequences of professional courses, he accumulates a profusion of general, theoretical, and applied courses in the biological and physical sciences; he may have been enrolled in a prescribed sequence in economics, a social science; but he will by no means have completed even the minimum general education requirements in the social sciences or in the humanities.

Published thinking of persons interested in pharmaceutical education has consistently recognized the need for these liberal courses. Edward C. Elliott (2), Blauch alone (3,4), Blauch and Webster (5), Sonnedecker and Urdang (6), Jarrett (7), Crossen (8), Lyman (9), McGrath (10), Guthrie (11), Kanig

*Presented to the Section on Legislation and Education, A.Ph.A., New York City, 1957.

and Chavkin (12), and Marsh (13) have directly or indirectly expressed their concern with overspecialization of professional curricula and the desirability of diluting the saturation by more frequent use of liberal arts studies. Many universities, recognizing the necessity for a better rounding out of the education of their students, have set up general education programs applicable to all students, liberal and professional, graduating from their halls.

The status of these general education programs in colleges of pharmacy, necessity notwithstanding, has been reviewed by Jennings B. Sanders, Specialist for Social Sciences, Division of Higher Education, of the United States Office of Education, on the basis of information available to him in catalogues, of which about two-thirds contained data for the year 1952-1953 and most of the rest covered the year 1951-1952.* See Tables I and II.

> The average four year pharmacy curriculum in sixty-nine institutions consisted of 139.2 semester hours, exclusive of physical education and military training. Of this total, 65.8 semester hours (47.3 per cent of the curriculum) were in professional courses; 30 semester hours (21.6 per cent) were in physical science; and 20.1 semester hours (14.4 per cent) were in the biological sciences. This made a total for these three subject areas of 115.9 semester hours, or 83.3 per cent of the total curriculum. The remainder of the curriculum consisted of courses in the social sciences and the humanities (10.1 semester hours); the communication arts (6.3 semester hours); mathematics (5 semester hours); and liberal arts electives not included in other subjects in the tabulation (1.9 semester hours). In twenty-three institutions, all hours were prescribed, and in the forty-six providing for electives, nearly one-fourth of the elective hours had to be in pharmacy.
>
> The five year program [data from five institutions] represented sizable semester-hour increases in pharmacy (12.2) and in the social sciences and humanities (8.2), smaller increases in the communication arts and liberal arts electives (2.5 and 2.3, respectively), and very slight increases in mathematics and physical science (0.6 and 0.1, respectively). The only decrease was [curiously] in biological science (4.5 semester hours). Thus it is clear that the social sciences and the humanities and other nonprofessional subjects fare somewhat better in the longer curriculum than in the standard four year program.

That the five year colleges studied are not taking *full* advantage of the fifth year was implied in the report: whereas the average annual load in the four year program was about thirty-five semester hours, that of the five year program was about thirty-two semester hours. This difference between the two curricula resulted in a total increase of only 21.4 semester hours, or approxi-

TABLE I

AVERAGE CONTENT, BY SUBJECT AREA, OF THE PHARMACY CURRICULUM

Subject	69 four year programs		5 five year programs	
	Semester hours	Per cent of total curriculum	Semester hours	Per cent of total curriculum
Pharmacy	65.8	47.3	78.0	48.5
Mathematics	5.0	3.6	5.6	3.5
Physical Science	30.0	21.6	30.1	18.8
Biological Science	20.1	14.4	15.6	9.7
Social Sciences and Humanities	10.1	7.2	18.3	11.4
Communication Arts	6.3	4.5	8.8	5.5
Liberal Arts electives not included above	1.9	1.4	4.2	2.6
Total	139.2	100.0	160.6	100.0
Total for Pharmacy, Physical Science, Biological Science	115.9	83.3	123.7	77.0

*The information contained in the ensuing two paragraphs is quoted, except for an alteration of tense, from reference (14), p. 3.

TABLE II

DIFFERENCES IN SEMESTER HOURS, BY SUBJECT AREA, BETWEEN AVERAGE FOUR YEAR AND FIVE YEAR CURRICULA IN PHARMACY

Subject	Increase in semester hours of five year over four year program	Decrease in semester hours of five year program
Pharmacy	12.2	.....
Mathematics	.6	.....
Physical Science	.1	.....
Biological Science	.....	4.5
Social Sciences and Humanities	8.2	.....
Communication Arts	2.5	.....
Liberal Arts electives not included above	2.3	.....
Total	25.9	4.5
Net increase of five year over four year program.	21.4	.....

mately two-thirds of an average year's work in a five year school (14). While the desirability of this reduction in load is not questioned, the fact of it remains.

When the disposition of the extra time provided by the five year program comes under discussion, pharmaceutical educators are confronted by a dilemma which has been well put by Kanig and Chavkin (12) into these words:

> It has long been the aim of those concerned with the pharmacy curriculum to include more humanistic and social education courses in order that the graduate be prepared to meet these responsibilities as well as the demands of his professional practice. However, with daily advances in medical science becoming a common occurrence, the need for more extensive and intensive professional specialized courses in the curriculum is keenly felt.

These authors express dissatisfaction with two year prepharmacy liberal arts programs and suggest that the best approach to a solution of the problem is the extension of the curriculum to five or six years wherein general education is "infiltrated into the professional courses."

The word ***infiltration***, with its overtones of intrigue, may well be suspect by pharmaceutical educators fearing an appropriation of professional curricular time by liberal arts offenders. Perhaps a more suitable expression of the recommendation would be "***percolation*** through the professional courses." This expression should be interpreted in the light of several possibilities: first, the highly desirable opportunity for assigning advanced students to general education electives offered at an upper-division level; second, the increased meaningfulness of certain ones of the professional courses that depart from a broad general education background; third, the dependence of others of the professional courses on specific liberal arts prerequisites; fourth, the exploration of courses in departments related to pharmacy that are similar in concept to the pharmaceutico-liberal offerings; and finally, the very interesting prospect of designing courses within the framework of the professional curriculum constituting liberal arts and humanities courses, but bounded by horizons that are strictly pharmaceutical.

LIBERAL ELECTIVES AT UPPER-DIVISION LEVELS

As general education programs are presently conceived, the requirements are included in the first two collegiate years. The course content of these liberal courses is, consequently, of a lower-division quality. Even with the guards set up to prevent too thick slicing (by requiring that work must be

completed in at least two areas) and too thin spreading (by setting minimum hours in at least one area), the efforts of the college to assure a more well-rounded education for its professional student are too frequently sacrificed on the altar of "accumulated credits." The student fills the requirements mechanically; he considers them hurdles in the path of admission to professional study. He ignores his counselor's guidance into courses in logic, ethics, psychology, and philosophy in favor of his friends' recommendations of more popular or of "pipe" courses.

It is possible that, with time available in the five year program, a student of greater academic maturity would be more receptive to liberal arts courses offered at an upper-division level. With increased challenge, with increased stimulation, these courses are frequently offered by departmental academic "stars," the best teachers and the most responsible authorities in the area, who make the material more immediately useful to the student and of more scholastic value to him. Reference here is made to courses in the humanities area such as inductive and/or deductive logic, the scientific method, social ethics, and in the social science area to courses such as cultural, social, or intellectual history of the classical, medieval, or modern periods or of the United States. The contributions from students with classroom experiences in courses of the nature of even the few examples mentioned to the pharmaceutico-liberal courses would be exciting, to say the least.

UPGRADED PROFESSIONAL COURSES BASED ON A LIBERAL BACKGROUND

Upper-division classes in history of pharmacy, in pharmaceutical ethics and jurisprudence necessarily proceed from a broad general education experience. A full understanding of the history of pharmacy requires more than a little contact with world history and American history and at the same time an ability to comprehend the problems of the profession of pharmacy. Here is integration of liberal arts and professional curricula at its simplest and most obvious! However, the teacher of history of pharmacy frequently has to resort to recall of the students' high school history courses, since under the usual free-elective system, the heterogeneity of credit precludes an assumption that all his students have taken collegiate courses in history.

Receiving more attention from pharmaceutical educators is the course in professional ethics, taught either separately or in combination with law. Here again is articulation of liberal and professional studies in a course already extant in most pharmacy curricula. Ethics is deserving of this increased attention; it lays a foundation for a moral code by which the profession may be practiced. Ethics has been defined as the science of the supreme end of human life and of the relations of voluntary acts and habits to the attainment of that end. If this statement is adapted to professional terms, ethics becomes the science of the highest purposes of professional practice and of the relations of voluntary acts and habits to the attainment of those purposes. In his paper, "Ethics and Professional Relations," presented at the Seminar for Teachers of Pharmacy at Butler University, 1955, Dean John F. McCloskey, whose college of pharmacy (Loyola University) places a particularly great stress on ethics, stated that his students are obliged to take courses in logic, metaphysics, psychology, and general and special ethics! He expressed satisfaction that this ambitious series of courses is bringing benefits to professional pharmacy in the

state of Louisiana. Ethics and law in other colleges are often developed against very sketchy backgrounds, since it is the rare pharmacy student who has submitted himself to the rigors of the general courses in ethics, sociology, logic, or psychology that Dean McCloskey described. The five year program will of itself not remedy this condition; however, if greater integration of liberal arts and professional instruction could be anticipated, some improvement could be hoped for.

THE PRESCRIPTION OF SPECIFIC LIBERAL ELECTIVES

Whether the privilege of freedom of choice of elective should be denied the student in favor of prescribed courses that will fill in background for subsequent liberal-professional studies is a moot question. Already several schools of pharmacy require an elementary course in economics as a basis on which to build later work in pharmaceutical economics, business, and management. The prescription of courses in the premedical curriculum (although the custom is becoming less defined) was not questioned by students anticipating the study of medicine; the prerequisites were not laid down blindly; and the reasons for them were understood and accepted. The practice could be extended to pre-pharmacy students; and certainly if the prescription of general education courses were undertaken, the integration of liberal arts concepts into the professional curriculum would become a much easier task.

PROFESSIONAL COURSES IN PHARMACY-RELATED AREAS

Characteristic of an intellectual community is a sharing of interests, and it is not uncommon to find at a university, in departments other than pharmacy, professors interested in the integration of liberal studies with their own fields of specialization. Thus, while history of pharmacy is an elective in the college of pharmacy, courses in the history of science, of medicine, of chemistry, of biology, or of mathematics are not rare. In addition, philosophy of science, great scientific ideas, legal medicine, medical ethics, the ethics of business practices, and a number of other courses related to interprofessional interests can frequently be taken for the asking. The instructors of these courses welcome the enrollment of pharmacy students in them, and the students taking them gain a remarkable understanding of the problems of other professional groups. Where time permits, this exchange of students and ideas should be encouraged under either a four year or a five year program.

SPECIAL PHARMACEUTICO-LIBERAL COURSES

The design and execution of classes of liberal genre but of pharmaceutical constitution present perhaps the most intriguing possibilities to the pharmaceutico-liberal integrationist. These courses would be liberal in concept, but the material studied in them would be limited strictly to pharmaceutical origins. For example, the history of pharmacy course could be slanted toward a study of pharmacy and the pharmacist in history; the course content would be history, but the approach would be specialized. As a variation on this theme, the germ of an idea for teaching history of pharmacy as a course in great ideas in pharmacy and the related sciences, using the Kremers-Urdang text as a foundation and building a series of self-contained lectures that would be excursions into the history of ideas and broad areas of medical and scientific development, was presented by Sonnedecker and Osborne at the Butler Seminar for Teachers of Pharmacy in 1955. Another pharmacy-social science elective might pursue any

number of papers of outstanding authors, including such titles as Urdang's *The Development of Pharmacopoeias* (15), his *Pharmacopoeias as Witnesses of World History* (16), his *Pharmacy's Part in Society* (17), or his chapter on economic development in the *History of Pharmacy* text (18), the Sonnedecker-Urdang discussion of pharmaceutical education in *Higher Education* (6); this elective might explore such subjects as the economic geography of drug cultivation and marketing, the sociological factors influencing the practice of pharmacy in rural and urban communities, or the psychology of the sick.

A similarly conceived course resulting from the marriage of pharmacy and the humanities might examine art in pharmacy and pharmacy in art, pharmacy in music (Haydn wrote an opera entitled *The Apothecary*), pharmacy in the drama (pharmacy did not escape Moliere's poison pen; and W. D. Wilcox has extracted copious references to drugs, diseases, and doctors from the dramatic works of Shakespeare*), pharmacy in literature (Chaucer makes interesting reference to fourteenth-century drugs, physicians, medical theory, and alchemy in the *Canterbury Tales*); Dr. Urdang has published a study of Goethe and pharmacy (19); and an example of prose literary classics that could be studied in this class is DeQuincey's *Confessions of an English Opium Eater*.

Most useful to a pharmacy student would be an integrated course in pharmaceutical communications—written and spoken English. The development of such a course might follow three general lines or be divided into three categories: communication of the pharmacist with other pharmacists; communication of the pharmacist with other members of the medical confraternity; and communication of the pharmacist with the laity. It might well begin with the letter of application for a job and the job interview, and proceed through the maze of business letter forms, technical report forms, professional and informal interview techniques. Assignments might include the detailing of the physician, the taking down of a prescription via telephone, the presentation of papers before professional meetings, letters of solicitation, and the presentation of talks before meetings of lay societies. This class would help prepare the student for community tasks that otherwise he would either avoid or learn to perform "the hard way."

Unfortunately, none of these integrated arrangements answer the purpose of *general* education as it is now fancied; further, their value would remain a function of the liberal background the student would have already built up prior to enrolling in them. Nevertheless, there is an opportunity for advanced electives in both the four year and the five year programs for at least a few students (those with available time) that should have a great appeal to the professional student.

TEACHING PERSONNEL

One very important question remains unanswered: whence is to come the personnel to administer such a program or to teach such courses? There are at most perhaps a half dozen persons in pharmacy in the country today who could be considered adequately trained for the assignment.

It was the contention of Kanig and Chavkin (12) that "the ideal teacher of pharmacy who would best be prepared to assume the responsibilities in an extended and integrated curriculum would be one with a broad knowledge of

*This work has not been published, but copies of the papers should be found in the archives of the Section on Historical Pharmacy of the American Pharmaceutical Association.

the technical aspects of pharmacy coupled with a comprehensive general education training." They then proposed a dual graduate degree derived from advanced study in the school of pharmacy and the school of education. This proposal was a bit unfortunate because the graduates from a school of education are usually just as overspecialized as are those from a college of pharmacy. Theirs is an emphasis (if not, perhaps, an "over" emphasis) on teaching techniques, statistical methods, testing procedures, all highly desirable for prospective teachers of pharmacy; but the general education, the broad training in the social sciences and in the humanities, is as absent from the graduate curriculum in the school of education as it is from the graduate curriculum in the school of pharmacy. It might be possible to work out a dual degree between pharmacy and the school of liberal arts and sciences that would give the candidate a sampling of general education areas and better qualify him for this specialized degree.

A better answer is embodied in a paper by Daniel Marsh (13), wherein he tries to answer the question: what does it really mean to be educated? He says:

> Academic degrees are regarded by some as the irrefutable sign of education. Degree idolatry, a prevalent form of present-day paganism, instead of being a sign of genuine full-orbed education is exactly the opposite.
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> . . . . . .
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> A degree is supposed to show the progress you are making on the high seas of education, a certain latitude or longitude. Rejoice at every evidence of progress, but never make the mistake of thinking that a degree marks the journey's end.

The prevalence of seminars, journal clubs, and research projects at colleges of pharmacy points up splendid means by which the faculties may continue their education past their degrees. But it is something of a tragedy that some pharmacy faculty members who teach on university campuses in the intellectual atmosphere provided by excellent departments in the liberal arts and sciences will never inspire a breath of that atmosphere. Isolated they are, and isolated they prefer to remain. This statement may sound a bit unrealistic, but it is made in all seriousness: a university person who does not take advantage of at least a few courses in alien departments while he has the opportunity might as well be operating in an academic vacuum. The answer to the old question of time is equally old: one never *has* the time, one *takes* the time. Any possible embarrassment to the instructor is erased by a demonstration of anxiousness to learn what he has to teach; generally, he will be flattered by the inquiry after permission to "sit in" on his class.

Sabbaticals and leaves of absence can be filled by visitations to campuses with special offerings in the general education areas taught by recognized authorities and well-known scholars. Such programs are sufficiently important to the field of pharmaceutical education that the profession should be willing to support it in the interests of better teaching. Perhaps, someday, the teacher —or prospective teacher—who desires to carry out a program to round out an overly specialized, technical education will be recognized, encouraged, and enabled. When that day comes, integration of liberal arts and the professional curriculum will follow quickly and easily.

Of the suggestions this paper has advanced for the integration of liberal arts with professional courses under a five year program, it may be that none is practicable. However, these suggestions have been discussed in the hope that they might elicit some stimulation of thought of possibilities for electives when the expanded curriculum becomes a reality.

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. . . the public at its worst has a higher regard for pharmacy and what pharmacy should be and do, than the average druggist himself. If it did not have, there would be no pharmacy students today and no support for pharmaceutical education in our universities.

Rufus A. Lyman, Am. J. Pharm. Ed., 7, 43 (1943)

THE PLACE OF SCIENCE IN EDUCATION*

J. FREDERICK WELTZIN

The basic theme of this conference recognizes that while the technological developments of our time offer great promise for the future, they also present us with many problems, some of them actual dangers to our peace and well being. This part of the conference is asked to consider these threats as they bear upon the work of higher education; and, in turn, my specific assignment is to point out these problem issues as they relate to the place of science in education.

The implications of this assignment are vast and beyond both my competence and time. Certainly I shall not attempt to say how much science shall be offered in the colleges and universities, nor what these sciences should be, and most certainly not what they should contain. Rather, I shall try to point out some of the problems of the general relationship of science and higher education. My assignment thus limited is still an appalling one.

Some of the issues I shall raise are obviously controversial. I do not shy away from them on this account, for controversy may stimulate thought.

I propose then to indicate nine problem issues which appear to me to threaten our educational equilibrium and shall, therefore, refer to them as potential dangers. How potent they are, I leave it to you to decide.

The basic potential danger. There exists the possibility that our country will fail to maintain sufficient science leadership in the world.

We have been hearing this threat enunciated on every hand during the last year, usually in statements that in the race for science leadership we are falling behind the Soviet Union. Is this actually true? This is the kind of generalization which is easily stated and often uncritically accepted. I am not competent to judge its accuracy. However, the mere possibility that this may be true is a threat of such vast proportions that it has shaken this country as have few things in our national history.

Political reaction has been immediate and quite violent; and, although some of these reactions have been of the destructive, scape-goating variety, it is encouraging to note that there has been widespread recognition that improvement in our science inevitably means improvement in science education.

There is, however, it seems to me, a possibility that the political, military, and economic aspects of scientific development may be overplayed. Beyond these things a further obligation rests upon higher education. Our world, our society, our mode of life does not stand still. We are moving rapidly toward a new kind of life, new ways of thinking, new values. The hope is that the new life will be more attractive, more comfortable, more secure, healthier, more interesting than the old. Scientific development will largely determine whether this is to be so. Nor do I think the people will leave scientific education for these objectives wholly to the option of higher education. The public will demand from the colleges and universities scientists who can bring these boons to the people, and institutions that fail to contribute satisfactorily will find themselves in difficulty with their constituents.

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This obligation upon higher education to provide science for the new times has three aspects—each, I suggest, at least equally important: the production of scientific knowledge itself, the training of scientists to staff the laboratories of the nation, and the preparation of teachers of science for the secondary and collegiate schools. The attainment of the latter two aspects of the obligation depends upon the success of a recruiting program, the discovery of able youth, and assurance that opportunity to receive the necessary training is made available to them. This recruiting program cannot succeed without the cooperation of the secondary schools.

A second potential danger. That there may develop once again a deadening public apathy as to our need to keep abreast of science developments in the world.

Apathy is a most dangerous thing. It has played a key role in the death of each perished civilization. Public apathy can be blind to the most obvious self interest. A shocking example of this is before us today. Recently the press announced that drug manufacturers have stopped the production of polio vaccines because the public is not bothering to use them. This complacency is in the face of the very recent universal yearning and earnest prayer for the time when the threat of poliomyelitis could be banished from the earth. Now thousands turn their backs on the actual accomplishment.

During the current year the American public has been aroused by the dramatic Russian satellite successes. At the moment there appears to be great willingness to make very extensive sacrifices to move science forward rapidly. Will this fervor last? Can it be maintained through years of sustained effort, or will the dead hand of complacency fall once again upon this effort?

It is not reassuring to recall that in the B.S. years (before Sputnik, that is) the efforts of educators and scientists to warn the public about Russian educational developments fell upon exceedingly deaf ears. A dozen years ago in a public addess, I called attention to an announcement by the U.S. Office of Education that for the first time the proportion of national income spent on education in Russia exceeded that of the United States, and pointed out the eventual threat this involved for us were the situation to be continued. I was shocked to read an item in the next morning's paper which implied that it was suspicious of a university man to mention such a favorable item concerning Russia!

Such complacency may return. Public consciousness of the Russian educational menace may wear thin. Our failure to overcome the remnants of past complacency and the growth of a new apathy will probably be seen in such attitudes and matters as the following:

A belittling of Russian scientific development.

The development of a fatalistic attitude, stated in such terms as, "We can't catch up with the Russians anyway."

Contention that it would cost too much to try to keep abreast of scientific developments in the world.

Contention that scientific development can be sufficiently supported by private industry and other philanthropy.

Failure to enable higher education to be competitive with industry for the services of research and teaching personnel.

The continuance of such anti-intellectual attitudes as those which have labeled science as wicked and unreligious and which held scientists up to scorn as either sinister or silly. Do you recall that Einstein was once pictured as a pathetic, harmless though kindly fool?

A third potential danger. That insufficient attention will be given to basic research.

I presume that the demand for immediate and practical results of funds expended on science has always constituted a problem for institutions of higher learning and for research workers generally. There is a sixteenth-century illustration of this among my own distant ancestors.

Occupying a remote twig in our family tree is the Danish mathematician and astronomer, Tycho Brahe. Under the patronage of King Frederick II he operated the observatory, *Uraniborg*, on an island in the Copenhagen harbor. There he observed the heavens and charted the stars. But the old king passed from the scene, and a young, brash monarch came to the throne; and, in reviewing the royal budget, he came upon Tycho.

"What does he do," he asked.

"He counts the stars," was the answer.

"What profit to Denmark is there in that," roared the king, "Fetch him before me."

To the question of how he justified the expenditures made upon him, Brahe is said to have replied,

"It is true that I observe and chart the stars and that there is no immediate financial return to Denmark. But the work that I do will sometime permit an abler man than I to establish important fundamental principles of science which will benefit all mankind."

This, however, did not impress the king, and he eliminated Brahe's appropriation. Brahe thereupon transferred to Germany and there completed the tables which in a later time helped establish the truth of the Copernican Theory.

The Tycho Brahe story has been repeated many times in many places in various dress. It exists today as a threat to adequate support of pure research. Doubtless it would be well for the public relations program of higher education to place emphasis upon keeping before the public the vital significance of fundamental research, stressing the point that in the long run there may be nothing as practical as theoretical science.

A fourth potential danger. That the emphasis in higher education be too greatly restricted to the natural sciences.

The satellite and missile programs, and especially their competitive international aspects, have so far focused attention on the physical sciences that there is a considerable danger of a damaging imbalance in our scientific development. That this is no idle threat can be seen in the many bills currently before Congress which almost exclusively deal with the support of physical science projects.

This is not to say that the natural sciences and mathematics should not receive a special emphasis at this time. I am rather persuaded that this is quite justified. However, the question is, will the stress on the natural sciences become so firmly established as to exclude proper support for the other sciences when the current critical need will have passed?

It would appear important for the administration of higher education to bring to the attention of the public the vital importance of adequate support

for the social sciences and the humanities. It might be emphasized that important as is the work of the natural scientist, he is seldom self employed. He is normally directed by someone else, and it is probably at least equally important that the employer be as well educated as the scientist whose work he directs.

It is of fundamental importance that public leaders, the formulators of state and national policy, the pace-setters, the writers, the philosophers, the moral leaders be carefully recruited and soundly educated. At the moment the evidence appears to be that the public is not so far convinced of this as to be willing to give support to the development of these leaders equal to that of the physical scientists.

A fifth potential danger. The development of an unfortunate dichotomy in education.

If the current emphasis on the natural and physical sciences should be carried too far, a split may well develop in the academic world, resulting in two more or less antithetical camps, the one representing the natural and physical sciences and the other, the social sciences and the humanities. Such a development would be most unfortunate. It would introduce a disintegrating factor, the results of which would no doubt cause difficulty for a great many years and would materially retard our progress.

Considerable faculty discord would undoubtedly be one of the results of such a dichotomy, and a consequent general lowering of morale. Workers in the humanities and the social sciences would tend to be placed in a defensive position. The disagreement between the two camps would likely become quite vocal with the result that a divided front would be presented to student bodies and the public. It could be expected that there would occur undesirable competitive bidding for able students, for appropriations, for prestige, for public support, and general recognition. It would be surprising were each camp to confine its promotion to the virtues of its position and refrain from pointing out alleged weaknesses in the opposite camp.

It is certainly to be hoped that this sort of thing can be avoided, for only a net loss for all concerned could possibly be the result.

A sixth potential danger. That we shall continue to fail properly to recruit and successfully to develop our talented young men and women.

Perhaps the weakest point in our entire educational system lies in the fact that perhaps as high as 50 per cent of the most gifted among our population do not receive the training necessary for them to make the contributions of which they are capable.

One of the basic needs is the provision in the secondary schools of the services of qualified guidance officials. Using the instruments now available, these people are able to advise talented students and their parents of the possibilities open to them. The advisement of the youth with more limited abilities is also important so that aspiration can be tempered by reality and waste of time and money, and eventual disappointment can be avoided. A good counselor will realize, however, that ability is not always a unified thing and that real talent in one field sometimes exists alongside limited ability in another. The whole matter of personality is also taken into account in sound advisement.

In advising a career in science for talented youth, the counselor still must often contend with unfavorable attitudes toward science and scientists, many of which are reflections of the misconceptions of the older generation. He

also must contend with an overenthusiasm for science on the part of students with limited abilities, resulting from the current excitement over the physical sciences. One of the most important issues in the counseling of able youth today is that of giving due consideration to the leadership needs of the country in the social science and humanity fields.

Studies consistently show that one of the chief reasons why talented youth do not go on to college or long continue there is their inability to meet the costs. I am personally convinced that we shall continue to fail fully to develop our best human resources until an adequate system of publicly supported scholarships is made available. I think also that this program should be supported in significant part by the federal government.

A seventh potential danger. That the secondary schools may be unable adequately to serve the needs of the talented youth among their students.

This is the theme that has evoked such a tremendous amount of discussion among the general public during the last year. One might get the impression from some of the things that are being said and written that the professional secondary school people themselves have hardly been aware of the problem or that they have resisted doing anything about it. Although this may be true in some individual instances, as a generalization it is remote from the fact. Since about 1915, when the great flood of high school attendance began, there has been great concern at the secondary school level as to how high school instruction might best be fitted to individual needs and abilities.

But to say that there has been great concern is not to say that the problem has been solved, for it has not. By and large, the secondary schools have been so overwhelmed by a number of factors beyond their control that the problem of how adequately to serve simultaneously gifted students and the average and the below average has just not been possible of proper accomplishment. It is actually amazing how much has been done, but yet it is not enough.

What are the prospects for the future? If the conditions controling the work of the high schools are not greatly improved, the prospects are not much better than they have been for fifty years. Indeed, some of the hampering conditions are increasing in intensity. The secondary school foundation for future scientists and other leaders, in the majority of high schools, continues to be in parlous state.

An eighth potential danger. That entrance requirement pressures from higher education may become so great as to cause an undesirable disruption in the secondary school program.

The question here is whether the attention given to future college students can be so overemphasized as materially to damage the services of the secondary schools to average students and those of even lesser ability. This, I think, is not only a possibility but has been occurring for many years.

The problem is most acute in the small high school where, because of staff limitations, the same curriculum must be offered to all. In a high school of a hundred students there may be twenty who are at least potentially college bound. The pressures from these twenty students and their parents for a college preparatory program may be strong enough so that all of the hundred students must study the traditional college preparatory courses. But to many these courses hold little interest; to others they are beyond their ability. If proper standards are maintained, a large proportion of the students are doomed to experience nothing but frustration and failure; if they are not, and standards

are lowered to meet the level of the average, lasting injury of the few able students will result.

This is a most serious dilemma for the small high school, and it is one that higher education has not always appreciated. Obviously the answer is not for the colleges to condone the lowering of standards but to lend their aid to the solution of the problem.

It is suggested also that higher education examine carefully its traditional course requirements for admission. Many studies have shown that the quality of a student's high school record and his basic ability test scores have a much higher predictive value as to future college performance than the pattern of courses pursued. Despite this, there appears to be a tendency to increase specific course requirements, and the danger is that truly brilliant students may be excluded from college because they have the misfortune to live in small towns whose high schools have been unable to offer the specifically required courses. If this happens, the colleges will defeat their own purposes.

President J. L. Morrill of the University of Minnesota has recently stated that in his opinion the lack of science, mathematics, or language knowledge as a cause for rejection of admission is unsound in these words:

> The floodgates seem opened for some new articulation of ancient prejudice—the professorial plea for an "educational elite" by those who patently are more impressed by what some freshman doesn't happen to know than by what he might be taught to learn.

A ninth potential danger. That our concentration on science may lead us to an unwholesome materialistic educational philosophy.

The accumulation of a given amount of scientific knowledge is no guarantee of wisdom. We cannot say that a man who has twice the scientific knowledge is thereby twice as wise. Science cannot furnish us with a philosophy of living, a moral code, nor determine ultimate human values. Yet are not these the most fundamental aims of higher education? If so, it would appear that the philosophy of higher education should be basically humanistic.

Bertrand Russell in his book, *The Scientific Outlook*, has said:

> If, therefore, a scientific civilization is to be a good civilization, it is necessary that increase in knowledge should be accompanied by increase in wisdom. I mean by wisdom a right conception of the ends of life. This is something which science in itself does not provide. Increase of science by itself, therefore, is not enough to guarantee any genuine progress, though it provides one of the ingredients which progress requires.

One of the ancient weaknesses of education has always been its tendency to value knowledge for its own sake, rather than as an instrument to be used to attain a human goal. There is danger that preoccupation with science may intensify this tendency. There is great need to emphasize the imaginative in every field of study. Research, one of the functions of higher education, should avoid being narrowly conceived; it should place great value on the creative. Too many research studies are simply enumerative and statistical. I have seen wonderfully creative doctoral theses sharply criticized because they were not sufficiently statistical.

Finally, we should make very sure that our assumptions are valid with respect to the place of science in general education. How liberalizing, actually, is the inclusion of science in liberal education? Undoubtedly, it has a place in the basic education of all, but how extensive should it be? What sciences are best suited to this purpose? The answers to such questions should be provided on the basis of valid evidence of its actual results.

CONCLUSION

Our progress up the path of unfolding civilization will be determined in very large part by what higher education does in the field of science. Great efforts will be called for in the field of science education, therefore. Yet the very progress of civilization may be brought to a halt, or diverted into blind alleys, if the humanistic aspects of education are not given at least equal attention.

One of the most intelligent characteristics of boards of pharmacy today is their frankness in seeing the limitations which surround them, and their desire to find a place in the pharmaceutical educational system more in keeping with their peculiar qualifications and more in response to sound educational principles.

Robert L. Swain, Am. J. Pharm. Ed., 6, 26 (1942)

PHARMACEUTICAL EDUCATION TWENTY-FIVE YEARS FROM NOW*

TOM D. ROWE

Those of you who have followed the history of American pharmacy, as described so ably by Wisconsin's Kremers, Urdang, and Sonnedecker are aware of the University of Wisconsin's contributions to pharmaceutical education. It is not my pleasant task to deal with this phase of the University's progress. As the Dean of a sister institution, however, I do want to comment briefly on one part of it. When the University of Michigan started a pharmacy course in 1868, its educational ideals were not accepted. Disregard of apprenticeship as a requirement for graduation and heavy emphasis on basic science were concepts foreign at that time to pharmaceutical education.

There was strong opposition to Dean Prescott of Michigan and his educational plan. As Dr. Sonnedecker states, "For a long time the University of Michigan stood alone . . . Then in 1883 the University of Wisconsin established its Department of Pharmacy." While Dr. Sonnedecker does not say so, in my opinion this act by the University of Wisconsin saved pharmaceutical education from continuing nationally for many years at a low level. After Wisconsin joined Michigan, a number of other state institutions followed, and the pattern for pharmacy education on a collegiate level was established. Thus we at Michigan have a particularly close feeling towards Wisconsin. We believe these two institutions started pharmaceutical education as it has developed today.

But enough of history—my topic deals with the future, and more specifically—pharmaceutical education in the future. None of us can accurately predict what will happen in the next twenty-five years. Now that the Russians have their satellite, it seems possible that almost anything can happen.

I only wish Dr. Kremers were here today. If he were, my job would be easier. I would find out what he was teaching, planning, and thinking *today,* and simply say to you: Here is pharmaceutical education of *tomorrow.* I would do this with confidence, because Dr. Kremers was always at least twenty-five years ahead of his time. In fact, he was often fifty years ahead. One example illustrates what I mean. In 1892, Dr. Kremers established an optional four year course in pharmacy here at Wisconsin. Not until 1932, forty years later, was this course adopted by all colleges of pharmacy. But unfortunately Dr. Kremers is not with us, so I must go this on my own.

May I say at the outset that I claim no clairvoyant powers. I can only state what appears to me to be coming, and some of these impressions are based on what has already happened.

We have just completed twenty-five years of operation of the four year program. We have found during this period that four years is not enough to do the job required. We can train a technician, but we cannot produce a well-educated pharmacist in that time. Consequently, as we all know, the five year program, including prepharmacy and professional education, becomes required in 1960. Already fourteen schools are operating on this program or a more extended one—the six year program.

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*Presented at the Seventy-fifth Anniversary Celebration of the University of Wisconsin, October, 1957.

We might well ask why the extension has become necessary. Now is not the time to present detailed discussion of the reasons for a five year program. But inasmuch as some of these do have a bearing on my topic, I should like to discuss them briefly.

First of all, it became increasingly obvious during the operation of the four year curriculum that not enough business subjects had been included. The operation of a retail pharmacy became more complex from a business angle than ever before. Consequently, we added courses in pharmacy management, pharmacy merchandising and others now cataloged under the general heading of pharmacy administration.

Second, the many advances in medical science made it necessary to spend more time on new developments and new drugs in addition to continuing courses in basic work. Third, many pharmacists, as well as pharmaceutical educators, felt the training was too narrow, with the result the pharmacy graduate knew pharmacy but little else of the world he worked in. Consequently, courses in general education were needed.

I would like to enlarge a little on the first two points mentioned. The addition of business courses reflects an effect the practice of pharmacy has on pharmaceutical education. We must educate our students to meet the needs of the profession. Consequently, meaningful discussion of what will happen in the next twenty-five years in education cannot be divorced from the practice of the profession in the future. No doubt the business side of pharmacy will continue to play an increasingly important role in the future, so we may expect to see continued and increased emphasis on these subjects in our curriculum.

The second point mentioned—the discoveries of medical science—also deals directly with the practice of the profession. These advances will certainly continue, and at an even more rapid pace than before. If our pharmacist of tomorrow is to keep abreast of the times, he will have to know more and more in the field of medical science. He must be taught in such a manner that he can understand the changes that will occur during his years of practice. We can be confident, also, that increased curricular emphasis will be placed on this side of pharmacy.

In order to handle these two phases properly, the student will need the basic disciplines already being taught.

These points are, I believe, rather obvious. I mention them primarily to indicate the effect of the practice of pharmacy on our educational pattern during the next twenty-five years.

We should, then, look at the possible changes in general pharmacy practice that may influence pharmacy education. What about self-service; or the trend to add pharmacy departments to supermarkets; or the development of super-pharmacies, with emphasis chiefly on nonpharmacy items? I am rather certain these trends will continue, unfortunately.

The self-service store, which to me presents a major stumbling block to increased professional recognition of pharmacy, will certainly be restricted in its activities. New drugs to be developed will require prescriptions or sale by pharmacists, with the result that items competing mainly with supermarket merchandise can be sold in this manner. Even though operating a self-service store, the pharmacist will have to be well trained in order to handle the many items which cannot be sold by self-service. This situation already exists to some extent, but it will become even more prevalent.

Because of competition, the operator of the pharmacy in the supermarket and of the superpharmacy will need all the education he can get in order to keep ahead or stay even with his competitors. Thus, while these operations will not help pharmacy professionally, they will not decrease the need for well-trained pharmacists. Furthermore, they will not materially affect the courses to be taught in the colleges.

While we can expect to have these adverse situations in operation, we will have some helpful developments to counteract and even overbalance them. There will be more professional and more semiprofessional pharmacies. Many pharmacists have already learned they can be more successful financially by concentrating on the professional side of pharmacy than on the purely commercial. Increasing numbers will come to this conclusion. The net result will be more professional activity on the part of the pharmacist. He will need to be better educated in order to carry out his professional duties. He will become more and more a source of information for the physician, but I do not believe he will become the close consultant that many people predict. He will need and demand all that the five year or the six year course can give him.

We cannot overlook the other fields of pharmacy and their effect on future programs. Hospital pharmacy will be taking in many more people than it is today, as will manufacturing pharmacy. These practitioners will require specialized training for their fields.

Considering the over-all picture, I think we can conclude that changes in the practice of pharmacy will not adversely affect the educational needs. The practice is going to need better-trained pharmacists than we now get from the four year program.

What then may we expect the educational pattern to be like twenty-five years hence? This is the point in my paper where I could make a dramatic prediction, and say that six or eight years of education will be universally required. I do not, however, think this will be the case. Actually, I think the pattern has already been set. We stayed at four years for slightly more than twenty-five years. I believe we will stay at five for an equal period of time. There are, however, some variations that will make the educational program different than it is today.

A number of schools will offer only the six year program. We now have two schools in California doing this, and by 1985 there may be fifteen or twenty more. The additional schools to offer only the six year program will probably be in states where more than one college of pharmacy is in operation. If the influx of students into pharmacy by 1970 is great enough, certain of the colleges will elect to train six year students only, leaving the other colleges to the five year program. The big "if" in this prediction is the number of students available.

As of now, pharmacy is not getting its share of the increased enrollments in the nation's colleges and universities. If this situation continues, then the number of colleges offering the six year program will be less than the fifteen or twenty I have suggested. Let us hope that increased efforts on recruitment of qualified students will enable pharmacy to get its share of the increasing enrollments in the future.

Some colleges will offer a six year optional program in addition to the standard five year one. This optional program will be a real six year curriculum and not, as is so often done now, an extension of the four year

curriculum over five years. There will be special courses, and in all probability, some of the professional courses offered before the fifth year will be different than those given in the regular program.

Whether the six year program is optional or required, the graduate will receive a doctor of pharmacy degree upon completion of the work. The graduates of the five year program will receive the B.S. degree. We will, therefore, have two classes of pharmacists—both qualified for licensure.

While this situation will be new to pharmacy, except in California, it will not be new to professional education. Nursing already has a comparable situation. In that field there are three year programs leading to a certificate in nursing, and there are four year collegiate programs which lead to the B.S. in Nursing. It is expected that the nurses having degrees will be supervisors and administrative heads in the future. The certificate holders will the floor and ward nurses. Possibly the same situation will develop in pharmacy—the doctors of pharmacy will become the leading professional pharmacists while the graduates with the bachelor's degree will be the operators of less-professional stores.

Except for the degree granted, law and dentistry both have two programs now. Some dental and law schools require two years preprofessional work while others require three. Furthermore, law offers a degree of Doctor of Jurisprudence to the honor law graduates.

These professions all seem to get along with their varied programs and degrees so I don't believe we need to be concerned over a comparable situation in pharmacy.

One thing has emerged from the law school situation. For the most part, those schools requiring the longer period for the prelaw and law courses have become the law schools of distinction. Probably a half dozen or so are considered far superior to the rest and attract students from all over the country. I should like to think this situation might develop in pharmacy—not solely because of what it would do for the colleges involved, but for what it would do for pharmacy. I think a situation such as described would help greatly to elevate the respect of the public towards our profession.

One other change we may expect in the pharmacy curriculum: There will be greater use of optional curriculums. Instead of one curriculum, as is generally the case today, there will be several: one for retail pharmacy, one for manufacturing pharmacy, one for hospital pharmacy, one for the preparation for graduate study, and possibly others. While the first two years of the professional curriculum (on a two-three program) will be much the same for all students, the last years will be decidedly different. Students in the various specialties will concentrate in those areas. This change will be good for pharmacy, because too often now we turn out all of our students from exactly the same mold. In the future we will have to vary our curricula to meet the needs of the profession.

In dealing with the curriculum of the future, I have made rather general statements. I have not attempted to be specific because I believe the exact courses to be offered, their names, etc., are of interest mainly to professional educators rather than to practicing pharmacists. There will be some new courses offered and certainly much new material presented.

Two other points concerning pharmacy education need to be discussed briefly. Without qualified faculties and without adequate physical facilities, no educa-

tional pattern, whether totaling two, three, four, six, or eight years, can be successful. We have been improving our faculties rapidly since World War II. We now have approximately 90 per cent of our faculty members with M.S. degrees or higher. Sixty per cent have Ph.D. degrees. By 1985 nearly 100 per cent of our faculty members will have Ph.D. degrees. They will be better qualified than ever before, and their teaching will be better.

As far as facilities are concerned, we should see tremendous improvement. Already many colleges, including Wisconsin, have occupied new buildings or wings of new buildings. By 1985 all the colleges will need nearly twice the space they now have. With their strengthened programs, better faculty, and increased student bodies, they will be in a position to demand this needed space. It surely will be forthcoming.

In summary, it appears to me that the pattern for pharmaceutical education twenty-five years hence has already been set. We will have a five year required course, a six year course required by some schools and optional in others. We will have a greater use of optional curriculums, and students will graduate with majors in various specialties of pharmacy. We will have well-qualified faculties, improved teaching, and more adequate facilities. We will not downgrade our educational efforts because of poor practices remaining in retail pharmacy. The increased emphasis on professional pharmacy will more than overcome the deleterious effects of self-service and other nonprofessional practices in some stores. Pharmacy education will continue to meet the needs of the profession as it has since the first American college of pharmacy was founded in 1821, and as it has for the past seventy-five years during the lifetime of Wisconsin's School of Pharmacy.

. . . pharmacists are not good propagandists. They lack vigorous spokesmen. The profession suffers because of the reticence of the men who practice it, a characteristic that in them somehow seems appropriate and commends them to those they serve.

Hugh C. Muldoon, Am. J. Pharm. Ed., 6, 186 (1942)

GRADUATE ENROLLMENT DATA, SEPTEMBER 1958 AND GRADUATE STUDY IN MEMBER COLLEGES FOR 1959-60

In January the fourth annual report on graduate study was mailed to deans, department heads, and librarians of all member colleges. The report includes enrollment data for September, 1958, and also carries brief statements addressed to prospective graduate students and describing the major areas of professional graduate study. A summary of certain data from the report is included here, along with tables showing graduate enrollment data for the current year and the member colleges that will be offering programs in one or more professional areas in 1959-60.

Abbreviations used in the tables are: M for M.S. program; D for Ph.D. program; S for special students; * for program available to students with a B.S. in pharmacy but offered in departments of the parent university other than its college of pharmacy. For additional explanatory notes see the complete report.

Fifty member colleges in the United States are listed as having graduate programs available for 1959-60 in one or more areas of professional instruction.

Forty-eight of these colleges reported one or more graduate students enrolled in September, 1958. Four hundred ten students were candidates for the M.S. degree, 305 for the Ph.D. degree, and 29 were special students. An additional 16 pharmacists were M.S. candidates and 41 were Ph.D. candidates in other departments of parent institutions, making a total of 426 M.S. candidates, 346 Ph.D. candidates, and 29 special students engaged in professional graduate study in institutions having member colleges of pharmacy. The grand total is 801, sixty-seven more than in September, 1957. When pharmacists known to be pursuing graduate study in other institutions are added, the total for pharmacists pursuing graduate study in September, 1958, undoubtedly exceeded 825.

Thirty-five colleges report that one or more types of local financial aids will be available to new graduate students in 1959-60. There will be available at least 90 fellowships, scholarships or research assistantships, 127 assistantships, and 21 internships in hospital pharmacy. This is a decrease of 104 local aids from a year ago. The local aids do not include a considerable number of AFPE fellowships which will be available. Also to be added are general university scholarships, fellowships, and other aids for which graduate students in member colleges may apply. Twenty-five colleges report that such aids will be available for new students in 1959-60. Additional aids preempted for 1959-60 by current holders bring the total of all aids to a figure estimated to be in excess of 625. This means that some form of financial aid is available to approximately four out of each five graduate students.

A majority of the fellowships, scholarships, and research assistantships provide stipends between $1,400 and $2,000; the assistantships between $1,400 and $2,000; and the internships between $1,800 and $2,400. Remission of tuition and nonresident fees is variable.

Six member colleges report that a total of eleven post-doctoral grants specifically for their colleges will be available in 1959-60, with stipends varying from $5,000 to $6,000 each.

A list of administrative officers (usually the dean) and college addresses is given in the complete report, which is available gratis from the Secretary, AACP, 833 South Wood Street, Chicago 12, Illinois.

Lloyd M. Parks, Chairman
Committee on Recruitment Aids

TABLE I

Graduate Enrollment, September, 1958

Member College	Phcy.	Ph. Ch.	Phcog.	Phcol.	Ph. Ad.	Ho. Ph.	Total
U. Arizona		1D*		1D*			2D*
U. California		17D		2D*			17D2D*
U. So. California	2M	2M2D	1M	2M		6M	13M2D
U. Colorado		2D		2M	1M1D		3M3D
U. Connecticut	4M1D	6D	3M1D	1M1D			8M9D
G. Washington U.				2M*	1D*		2M*1D*
U. Florida	1M6D	2M3D		1M5D			4M14D
U. Georgia				2M			2M
U. Illinois	2M	8M8D1S	1M	5M*3D*			11M5M*8D 3D*1S
Butler U.	1M	4M		4M4S	1M*1S*	2M	11M1M*5S
Purdue U.	14M12D	11M15D	2D	9M4D	2M1D		36M34D
S. U. Iowa	8M7D	3M5D			1M*	9M	20M1M*12D
U. Kansas	1M	6D		2M1D*			3M6D1D*
U. Maryland	2M5D	2M5D		2M		5M	11M10D
Massachusetts	1M2D	8M1D1S	3M	3M			15M3D1S
U. Michigan	6M17D	8M15D		15D*	1M*	11M	25M1M* 32D15D*
Wayne S.U.	4M		4M	4M	2M		14M
U. Minnesota	1D	10D		4D			15D
U. Mississippi	1M	2D		1M*			1M1M*2D
St. Louis C.P.	12M3S					2M	14M3S
U. Kansas City		2M		2M			4M
Montana S.U.	1M						1M
U. Nebraska	2D			1M		1M	2M2D
Rutgers U.	2M5D1S	1M2D1S		3M			6M7D2S
Brooklyn C.P.					24M5S		24M5S
Columbia U.	17M1S	4M1D	2M	4M1D*			27M1D 1D*1S
St. John's U.	4M						4M
U. Buffalo	2M	1M1D		2D*			3M1D2D*
U. No. Carolina	1M2D	2M6D					3M8D
No. Dakota, A.C.	2M	1S		2M		8M	12M1S
Ohio S.U.	4M3D	2M4D		5M3D	1M		12M10D
U. Cincinnati		3M					3M
U. Oklahoma	1S			2M*			2M*1S
Oregon S.C.	1M	1D		1M			2M1D
Duquesne U.	1M	2M2S	2M	1M		2S	6M4S
Philadelphia C.P.	5M4D	2M3D	1D	5M		2M	14M8D
Temple U.	3M2D	5M		2M2D			10M4D
U. Pittsburgh	4M9D			4M4D	2M2D	15M	25M15D
U. Rhode Isl.	2D	1M1D	1M2D	3M1D			5M6D
So. Dakota S.C.	1M	1M1S					2M1S
U. Tennessee				2M*4D*			2M*4D*
U. Houston		1M					1M
U. Texas	3M3D	1D1S		2M1D		1M	6M5D1S
U. Utah	1D	2D	4D	1M5D	1M		2M12D
M.C. Virginia		3M5D				1M	4M5D
S.C. Washington	2M1D	1M2D	1D				3M4D
U. Washington	2M2D	2M2D	2M2D	1M*7D*			6M1M* 6D7D*
U. Wisconsin	15M24D†3S	9M15D		3D*	8M4D		32M43D 3D*3S
Total Masters	129	90	19	68	41	63	410
Total Doctors	111	143	13	30	8		305
Total Special	9	8		4	6	2	29
Total Masters*				13	3		16
Total Doctors*		1		39	1		41
Grand Total	249	242	32	154	59	65	801

† Includes 2 candidates in History of Pharmacy

TABLE 2

Graduate Programs Available, 1959-1960

Member College	Phcy.	Ph. Ch.	Phcog.	Phcol.	Ph. Ad.	Ho. Ph.
Alabama P.I.	M	M	M	M		
U. Arizona	M	M D	M D	M D	M	M
U. California		M D		M*D*		
U. So. California	M D	M D	M D	M	D*	M
U. Colorado	M D	M D		M D	M D	M
U. Connecticut	M D	M D	M D	M D		M
G. Washington U.				M*D*	M*D*	
U. Florida	M D	M D	M D	M D		M
U. Georgia	M	M		M		
U. Illinois	M	M D	M	M*D*		
Butler U.	M	M		M		M
Purdue U.	M D	M D	M D	M D	M D	M
Drake U.				M		
S.U. Iowa	M D	M D	M D	M*D*	M*D*	M
U. Kansas	M	M D	M	M D*		
U. Maryland	M D	M D	M	M D		M
Massachusetts	M D	M D	M D	M	M	M
U. Michigan	M D	M D	M D	M*D*	M*D*	M
Wayne S.U.	M	M	M	M	M	M
U. Minnesota	M D	M D	M D	M D	M*D*	
U. Mississippi	M	M D		M*	M*	
St. Louis C.P.	M					M
U. Kansas City		M		M		
Montana S.U.	M	M		M		
U. Nebraska	M D	M D	M D	M D		M
Rutgers U.	M D	M D		M		
Brooklyn C.P.					M	
Columbia U.	M D	M D	M	M D*		
St. John's U.	M	M				
U. Buffalo	M	M D		M*D*		M
U. No. Carolina	M D	M D				
N. Dakota A.C.	M	M	M	M		M
Ohio S.U.	M D	M D	M D	M D	M D	M
U. Cincinnati		M				
U. Oklahoma	M	M	M	M*D*		
Oregon S.C.	M D	M D	M D	M D		
Duquesne U.	M	M	M	M		M
Philadelphia C.P.	M D	M D	M D	M D		M
Temple U.	M D	M D		M D		M
U. Pittsburgh	M D		M	M D	M D	M
U. Rhode Isl.	M D	M D	M D	M D	M*	
So. Dakota S.C.	M	M	M	M		
U. Tennessee		M*		M*D*		
U. Houston	M	M	M	M	M*	M
U. Texas	M D	M D	M D	M D	M D*	M
U. Utah	M D	M D	M D	M D	M D	
M.C. Virginia		M D		D*		M
S.C. Washington	M D	M D	M D	M D		
U. Washington	M D	M D	M D	M*D*		M
U. Wisconsin	M D†	M D	M D	M*D*	M D	
Total	42M25D	44M31D 1M*	31M19D	33M17D 11M*13D	11M6D 7M*6D*	25M

† Includes program in History of Pharmacy

REMINGTON HONOR MEDAL CITATION FOR ELI LILLY*

HUGO H. SCHAEFER

If Professor Joseph Price Remington, in whose memory the award we are presenting this evening is being made, could be present on this occasion, I am sure he would endorse all of the fine things that have been said about his former student, Eli Lilly.

Others this evening have referred in glowing terms to the character and achievements of the thirty-fifth recipient of the Remington Honor Medal. And this has not been a difficult task for them, because the man we are honoring has accomplished so much that he clearly deserves all of these tributes and more.

As the one designated to present this medal to the man selected by the Ex-Presidents of the American Pharmaceutical Association to be honored this year, my very pleasant task could, therefore, be interpreted as an attempt to gild the member of the Lilly family whom we are honoring tonight. Actually, this medal which the New York Branch of the A.Ph.A. presents to the person who has done most for pharmacy in the past year or cumulatively over a number of years, really is a Gold Medal. As Treasurer of the American Pharmaceutical Association, I am personally aware of this. It goes tonight to the man who last year celebrated the golden anniversary of his entry into the active practice of pharmacy with the firm founded by his grandfather in 1876, just 100 years after the Declaration of Independence of the United States.

It goes to him not only because the members of the jury of award believe him worthy, but because pharmacists everywhere, whether they be affiliated with professional, industrial, scientific, educational, or administrative activities believe he exemplifies that dedication to professional ideals and public service which entitles pharmacy to the prominent place it occupies in the healing arts as an indispensable member of the team that works continuously for the improvement of the public health.

And so, Dr. Eli Lilly, distinguished pupil of Joseph P. Remington; outstanding industrial pharmacist, who never lost the common touch with the prescribers and ultimate distributors of life saving and disease preventing medicaments; man of vision who has delved extensively into the past with an eye toward brightening the future; ardent believer in the essentiality of research, both fundamental and applied, as the key to continued triumphs in the discovery of new weapons for the conquest of disease; philanthropist and benefactor of the health professions, agriculture, the arts and sciences, education, music, fine arts, and the preservation of historical lore (many of whose contributions to pharmacy as well as to social, civic and industrial welfare remain unknown because of your inherent modesty) I am very happy to present to you in behalf of the New York Branch of the American Pharmaceutical Association this thirty-fifth impression of the Remington Honor Medal which memorializes your distinguished teacher, and which we ask you to accept as a token of our deep appreciation of your accomplishments for the advancement of pharmacy during the past half century of your affiliation with the profession.

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*Given at the Remington Medal Dinner, December 10, 1958, New York City.

MINUTES OF THE INTERIM MEETING EXECUTIVE COMMITTEE

Palmer House, Chicago, Illinois November 6, 7, 1958

The meeting was called to order by Chairman Hewitt, November 6 at 9:30 A.M.

Present: President, Louis C. Zopf; Past President, Tom D. Rowe; Vice President, Charles W. Bliven; Chairman, Harold G. Hewitt; Perry A. Foote; E. Emerson Leuallen; Ewart A. Swinyard; Secretary, George L. Webster; Editor, Melvin R. Gibson.

Absent: Louis W. Busse.

1. Approval of Minutes of the Post-Session Meeting (Los Angeles, California).

The Chairman called for additions or corrections to the published minutes of the post-session meeting and, hearing none, the minutes were approved as printed in the *Journal*.

2. Proposals for Additions to the Agenda.

The chairman called for additions and received several which were included in the matters to be presented and discussed.

3. Communications.

a. The Secretary presented letters received from Acting Dean Matthew T. Watters of Florida Agricultural and Mechanical College, School of Pharmacy, which called attention to the fact that his office had not received preliminary notice of the program to be offered at the meeting of District 3 AACP and NABP. A copy of his letter to the Secretary of District 3 was enclosed. Dean Watters did not receive a reply to this communication, and, since he suspected the difficulty lay in the matter of segregation laws in Mississippi where the meeting was to be held, he enclosed a copy of his telegram sent to the Secretary of District 3 at the time of the meeting.

This matter was given consideration by the Executive Committee and the Secretary was directed to transmit to Acting Dean Watters our regrets that a member college had been prevented from attending a meeting sponsored by the Association and to reiterate that the Association's stand on this matter had not changed since it adopted the resolution (Resolution No. 8, 1955) directing: "all of its officers and those of the Districts coming under its jurisdiction to hold meetings of this Association and its Districts only at such places and under such circumstances that all members of this Association are free to attend, and that this directive be sent at once to all parties concerned."

The Secretary was directed to call to the attention of all deans and members of faculty who plan district meetings that the principle of equal opportunity to attend all such meetings should be defended.

b. A communication from Secretary Gloria E. Franke of the American Society of Hospital Pharmacists telling of a proposal to initiate a course for the training of pharmacy technicians by a group of hospital pharmacists in Cleveland, Ohio. This is to be administered in one or more of the junior colleges of Cleveland. President Zopf contributed a copy of the proposed syllabus of instruction. After discussion *it was moved* by Zopf-Rowe that the Secretary write to Secretary Fischelis of the A.Ph.A. urging prompt action to discourage such inadequate courses and offering the cooperation of this Executive Committee in any meeting called to discuss this matter.

4. Report of Commercial Auditor.

The Treasurer presented copies of the financial report for the year ended July 31, 1958, as audited by Albert J. Schneider, C.P.A. After study, *on motion* of Zopf-Leuallen, the report was accepted.

5. Report of President Zopf.

The substance of this report was more information on the technicians course for assistants in hospital pharmacies as mentioned in item 3.b. above.

6. Progress Report Committee on Recruitment Aids.

a. The Secretary reported the summaries that have come to his office from Sterling Movies U.S.A., which show that through September 30, 1958, the film *Design for Life* has been shown 246 times on television to audiences estimated at 12 million persons and to 3,019 audiences totaling 176,726 persons. *Time for Tomorrow* has been shown on television 267 times to audiences estimated to number 13.5 million persons and to 5,512 audiences numbering 180,846 persons. Since 1954 when the first special grant from the American Foundation for Pharmaceutical Education was received this operation of the Association has handled a total in grants from AFPE ($110,000) and sale of films, film strips, and Pharmacy Study Portfolio ($13,643.91) of $123,643.91. Of this total $114,213.22 has been paid out for film production, films, meetings, printing, and promotional expenses. There remained at the beginning of the fiscal year a balance of $9,430.69 in the fund. At the present rate of use of the films, approximately $1,000 per month is being expended for sponsored showings of the films to small groups and on television. At this rate the fund will be exhausted in May, 1959, unless additional funds become available.

Correspondence has been had with Mr. Charles D. Doerr of McKesson and Robbins who has prepared a chart showing the number of times each film has been shown in the individual states. The Committee on Recruitment Aids has access to this tabulation and will probably include the information in its report to the Association. As a result of other suggestions from Mr. Doerr, the Secretary's office will ship one copy of the Charles Pfizer Company booklet *Your Career Opportunities in Pharmacy* for every Pharmacy Study Portfolio ordered after November 1, 1958.

The Executive Committee was informed of the existence of the booklet *Why Should a Girl Become a Pharmacist* which is now available through McKesson and Robbins.

b. Chairman Hewitt informed the Committee that he had presented to the Executive Committee of the American Foundation for Pharmaceutical Education a request for continuing financial support of the sponsored showings of the films for three more years. This presentation received approval of this Committee by mail during the summer and was confirmed at this time.

7. Report of the Editor, American Journal of Pharmaceutical Education.

The Editor reported on the steps necessary to and on the advisability of obtaining a copyright on the *Am. J. Pharm. Ed.* After discussion, *on motion* of Rowe-Foote, the Business Manager of the *Journal* (the Secretary) was instructed to take steps to copyright each issue of the *Journal* beginning with Volume 23, No. 1, Winter, 1959.

The Editor described his method of selecting reviewers for the Book Review section of the *Journal* and his purpose of matching the reviewer with the subject matter of the book.

He disclosed the general plans for the *Journal* for Volume 23. The Winter issue will contain a feature section on a number of aspects of continuing education in pharmacy. The Spring issue will be an historical issue. The last two issues will contain the report of the Annual Meeting and the Teachers' Conference.

A contract for Volume 23, 1959, as submitted by the State College of Washington Press was presented and discussed. It represented an increase of $970 over the previous year's contract. An adjustment was asked by the press on the contract for 1958 of $500 as a share of the much larger increase in cost of production occasioned by an increase in wages of typesetters and press men. This was approved *on motion* of Rowe-Zopf.

Since the contract submitted for 1959 was based upon a volume of the same size as Volume 22 and since the Editor reported the beginning of an accumulation of worthy contributions due to lack of space, *it was moved* by Leuallen-Swinyard that a new contract letter be sought for an issue up to 650 pages and that, upon receipt of such a letter which would be satisfactory to the Publications Committee, they be empowered to act. The motion was approved.

8. Reports by Representatives at District Meetings.

Reports were made of interesting and valuable meetings in Districts 2, 3, 5, 7, and 8. Other districts will meet at later times and will be reported at the next meeting.

9. Financing of Predictive Tests.

Nothing new has been accomplished in this matter, but information presented by the Secretary furnished hope that this matter might become active again.

10. Enrollment in 1958-1959.

Chairman Hewitt presented the enrollment figures as compiled in his office. They showed a small (4.1 per cent) increase in undergraduate enrollment generally with decreases in a number of colleges and in two districts. This report is to be distributed.

11. Reports of Representatives to Meetings.

a. Chairman Hewitt reported Dean Sprowls' comments to him of the meeting of the NARD in Philadelphia which contained a recommendation that this Association continue to be represented.

b. Chairman Hewitt reported that he had represented the Association at the installation of the new President of the University of Rhode Island.

c. Dean Leuallen reported attendance on behalf of the Association at the Health News Institute, General Advisory Committee, on October 14, 1958. As a result of information received at this meeting he suggested that one or more of the officers should become acquainted with the program of activities and accomplishments of the Association of American Medical Colleges and the sources of support for these activities. Since the headquarters of this Association are in Evanston, Illinois, this matter was referred to the Secretary and President Zopf for action. He also suggested that the several sponsors of the recruiting pamphlets which are being so widely used should be tendered a letter of appreciation from the Association.

Dean Leuallen was instructed *on motion* of Bliven-Rowe to volunteer the services of a representative of this Association to the Health News Institute for the purpose of revising and modernizing the section on pharmacy in the

Fact Book. He also suggested that some effort be made to call attention to the interesting and valuable articles appearing in the *American Journal of Pharmaceutical Education* and that there was need for one or more stories on pharmaceutical education in the medical press.

d. Dean Bliven who was the Delegate to the House of Delegates of the American Pharmaceutical Association from this Association reported on the recently concluded midyear meeting. The subjects discussed were (a) Prepayment plans for cost of medicines; (b) Changes in the procedure of nominating officers; (c) Restriction of sales of drugs to pharmacies and pharmacists; (d) Change in date of Annual meeting from spring to fall (see item 17).

12. Invitations from Colleges of Pharmacy to Act As Host to the 1959 Teachers' Seminar on Pharmacognosy.

Invitations were received and discussed. It was voted to accept the invitation of the University of Illinois College of Pharmacy for the week of August 9, 1959, or such other date as might be determined to be more acceptable to prospective enrollees. The Seminar Committee included Dean George L. Webster, Chairman; Dr. Ralph F. Voigt, Dr. Frank J. Crane, Dr. Varro E. Tyler, and Dean Heber W. Youngken, Jr.

13. Association Representation at the Remington Medal Dinner, December 10, 1959.

The Secretary was directed to write a letter of congratulations to Dr. Eli Lilly for the occasion. A member of the Executive Committee, Dean Leuallen, is co-chairman of the program, and Chairman Hewitt and other member representatives of this Association will attend.

14. Joint Meeting with the American Council on Pharmaceutical Education and the Officers of the Association.

No date has been set for this meeting. If it is to take place Chairman Hewitt and the Secretary will be notified.

15. Disposition of Resolutions Passed at the Annual Meeting.

Resolution No. 9: *On motion* of Zopf-Rowe the Secretary was authorized to pay the expenses of Dean John G. Adams to attend an assembled meeting of the Committee on Hospital Pharmacy Education when it is called.

Resolution No. 10: Chairman Hewitt reported no success in interesting financial support for a survey to determine "high school student opinion concerning pharmacy as a career."

Resolution No. 18: *On motion* of Zopf-Rowe the Secretary was authorized to pay the expenses of Dean Linwood F. Tice incurred in attending a meeting called to "redefine the term 'pharmacy' in a manner consistent with its present meaning and including its important distributive functions."

16. Committee on Changes in Order of Business and Bylaws.

This committee had nothing to report at this time.

17. Committee on Combined Meetings of AACP and Teachers' Seminar.

Dean Rowe, Chairman, presented an exchange of correspondence with Secretary Fischelis of the A.Ph.A. on this matter. No definite information had been offered as to the possible change in date of the A.Ph.A. annual meeting. This was resolved during the meeting. It was determined that this meeting and the meetings of this Association would be scheduled for the week beginning August 16, 1959.

A discussion of the benefits to be derived from a more extended meeting for the American Association of Colleges of Pharmacy resulted in a decision to announce that the AACP would begin its first session of the Annual Meeting on Saturday morning August 15, 1958. A tentative time schedule was worked out and approved which is as follows:

Saturday August 15, 9-12 A.M. First General Session
Saturday August 15, 1:30-5 P.M. Second General Session
Sunday August 16, 1:30-5 P.M. Third General Session with part of the program provided by the Council on Conference of Teachers.
Monday August 17, 9-12 A.M. Section of Teachers of Chemistry, Section of Teachers of Pharmacy Administration
Monday August 17, 1:30-5 P.M. Section of Teachers of Biological Sciences, Section of Teachers of Pharmacy
Tuesday August 18, 9-12 A.M. Section of Teachers of Graduate Instruction
Tuesday August 18, 1:30-5 P.M. Fourth General Session

It was moved and approved that the Secretary and President arrange the program in this manner and inform the member colleges of the new time table at an early date.

18. Invitations to an Officer of the NARD, NABP, A.Ph.A., ACA, ASHP To Be Presented to Our Annual Meeting.

The Secretary was instructed to issue invitations to these organizations to have their President or Secretary or both be presented to our meetings.

19. Current Contents Subscriptions.

An invitation to subscribe to this newly published journal for the use of member colleges was discussed. It was the sense of the committee that such subscriptions were not proper use of Association funds but should be taken up with the individual colleges.

20. District Programs.

Dean Rowe reported receiving some comments about the appearance, during last year, of representatives of the National Pharmaceutical Council on many district meeting programs. The Executive Committee is of the opinion that the secretary of the district has the responsibility for the choice of program and speakers, and if the topic presented by the representative of the NPC fits into the theme of the meeting he will and should be invited to participate.

Chairman Hewitt presented a list of topics which could be used in organizing district programs. The list is as follows:

(1) Need for permanent secretary.
(2) Predictive tests, need for and support of.
(3) Recruitment of the better-qualified students.
Need for central coordinating agency.
Increased activity by alumni.
More active cooperation between schools and retail pharmacists in presenting our case before high schools, showing all vocational outlets for qualified trainees.
Encourage use of the two new films by college board members and retailers, *Time for Tomorrow* and *Design for Life*. Not only color-sound films, but the black and white for television use.
Specific recruitment need in interesting people in teaching pharmacy as a vocation.

(4) Cooperation of colleges and boards in a manpower survey.
(5) Value of subscription to our *American Journal of Pharmaceutical Education* for board and college members.
(6) Cooperation between colleges and boards in developing meaningful internship programs.

21. Relationship of the AACP to Reports of Research in Member Colleges.

It was moved Rowe-Webster and approved that a letter be sent to member colleges stating that the Association is not currently engaged in a survey of research projects in colleges of pharmacy. Any information of this character supplied to other than authorized committees or officers of the Association is a matter of judgment of the dean or faculty concerned. Member colleges are reminded that all authorized questionnaires carry (or should carry) the statement that the subject of the investigation is known to and has the approval of the Executive Commitee.

22. New Form for Annual Report.

Chairman Hewitt reported that a new form for supplying enrollment information was being prepared.

23. Nomination of Director of the American Foundation for Pharmaceutical Education.

President Zopf was nominated to be suggested to the Board of Directors of the AFPE as the representative of this Association on that board upon the expiration of the term of Dean Linwood F. Tice at the close of the annual meeting of the Board of Directors in 1959.

24. Annual Request for Financial Support for the Journal and the Teachers' Seminar.

The Committee approved the submission of a request for a grant in support of the *Journal* in the amount of $8,000 since the printing contract indicated a rise in cost of approximately $1,000 for the same number of pages as in Volume 22 and there was a demonstrated need for a *Journal* of larger size which would increase the cost still further.

The Seminar Committee of 1958 was able to conduct its meetings within the allotment of $8,500. The committee approved the submission of a request for this amount from the AFPE.

25. Cooperation of National Pharmaceutical Council with the Association.

Chairman Hewitt reported plans being studied for an Industrial Seminar on Management to be arranged and sponsored by members of the National Pharmaceutical Council. Other tentative plans are being discussed for increasing the number of opportunities for employment of teachers in colleges of pharmacy in industry plants during the summer. An announcement of these plans is expected before the end of the year.

26. Federal Aid to Education.

President Zopf represented the Association at a meeting with the Secretary of Health, Education and Welfare and other officials where the provisions of the recently enacted law permitting financial aid to colleges, universities, and students were explained and discussed. He outlined the several areas of loans and undergraduate and graduate assistance which were provided.

The second session of the meeting was called to order November 7 at 9:30 A.M.

The discussion centered about the arrangement of the program for the annual meeting which is described under Item 17 and on matters of finance for the *Journal* which are recorded under Item 7 of these minutes.

27. Change in Order of Publication of Journal.

Editor Gibson pointed out that the change in date of the annual meeting from April to August would make it impossible to report the activities of this meeting in the Summer issue (No. 3). Because of the pressure of teaching duties in the fall, the report of the convention might be delayed until the Winter issue (Vol. 24, No. 1).

28. Nominations for Officers of the A.Ph.A.

The present delegate to the House of Delegates, Vice-President Bliven, suggested that he thought it in order to consult the members of the Executive Committee as to any nominees he should make on behalf of the Association. *On motion* of Swinyard-Foote he was instructed to poll the members of the Executive Committee for suggestions in advance of making his nominations.

29. Need for a Full-Time Secretary.

The opinion was expressed that previous statements of purpose and need of a full-time Secretary had not been well substantiated. The Secretary was asked to make a study of the operations of the full-time offices of the Association of American Medical Colleges and American Association of Dental Schools and report to the Executive Committee at its next meeting.

30. Survey of Progress on the Five Year Program.

A discussion of the impending inauguration of extended programs of education for pharmacists indicated a need for some additional information on the plans of member colleges. Much helpful thinking has been done by faculties in making out their curriculums. Unless an effort is made to collect and publish the essence of this planning, it will be unavailable to other faculties.

It was suggested that the Committee on Curriculum collect the facts and prepare a report on curriculums now in operation and contemplated which require more than four years after high school graduation to complete. Particular attention should be given to the reasoning behind the selection of courses, particularly those in the fields of general education and liberal arts, as well as in the scientific and professional areas. A helpful report to faculties which are still undecided is Pamphlet 113, Department of Health, Education and Welfare *General and Liberal Educational Content of Professional Curricula, - Pharmacy.* This can be had from the Superintendent of Documents, Washington, D.C., for 15 cents.

31. American Foundation for Pharmaceutical Education—Grants.

a. An improvement in timing of the award of graduate fellowships would be appreciated. When the decisions are made late in the spring, the applicant as well as the college runs the risk of losing not only the AFPE grant but also an industrial grant which has been awarded elsewhere. It is suggested that the Board of Grants of the AFPE be asked to make its awards by February 1, if possible.

b. Because the college which accepts the fellow unavoidably incurs substantial indirect costs in providing space and facilities, and in view of the fact that government as well as industrial fellowship sponsors have taken this into account, it is respectfully requested that the Board of Grants of the AFPE consider awarding funds for the payment of such indirect costs.

c. It is respectfully requested that the Board of Grants of the AFPE reconsider its policy of awarding less than full-time fellowship grants. It is the opinion of members of the Executive Committee that only two types of grants should be made; (1) full-time fellowships for married students and, (2) full-time fellowships for unmarried students.

d. It is respectfully suggested that the Board of Grants of the AFPE consider awarding funds to recipients of its fellowship for necessary travel to seminars or meetings of specialists in the area of investigation so that the fellows gain ideas and suggestions from the papers presented at such meetings and from personal contact with others in the field.

32. Committee in Graduate Education in Pharmacy Administration.

A sample questionnaire to be circulated among member colleges was presented by Dean Rowe. The Committee gave approval of the proposed investigation.

33. Labeling of Prescriptions with Names of Ingredients.

This matter was presented by Dean Foote. A discussion ensued. The Executive Committee members are aware of this type of request by physicians in a number of locations. It did not appear to be a matter upon which it could act at this time.

34. Offer of File of Back Numbers of American Journal of Pharmaceutical Education.

Dean Arthur F. Schlichting, Dean Emeritus, St. Louis College of Pharmacy and Allied Sciences, has a nearly complete file of copies of the *Journal* which he will make available to any College of Pharmacy needing them. This offer was made in a letter to the Secretary which was transmitted to the Executive Committee. Anyone interested should write to Dean Schlichting.

George L. Webster, Secretary

Let colleges of pharmacy insist in their teaching upon full thoughtful adherence to these principles (A. Ph. A. Code of Ethics), *and their graduates will be given the same confidence and respect in their field that the physician is given in his.*

Nathan B. Eddy, Am. J. Pharm. Ed., 6, 185 (1942)

PRESIDENT'S SECTION . . . . . .

THE VALUE OF CONTINUITY IN ORGANIZATION

There is value through individual participation in every project by as many as can be reasonably utilized productively and without confusion of purpose. In other words, an organization is as strong as the participation of its constituents and as weak as the least informed of its members. Perhaps this is academic idealism, but stimulation of individual interest in the organization as a unit is a necessity for fortification of objectives. However, organization must have an administrative head or group from which, and through which, ideas, policies, and principles are guided.

Pharmaceutical educators, somehow—but soon—must re-evaluate the present familial administrative pattern for the operation of the American Association of Colleges of Pharmacy. Our membership is growing steadily. We are expanding our membership classification, and we currently represent the largest number of pharmaceutical educators at any time in our history. We have a literature, and we have an obligation to the total profession to be continuously available for counsel, for guidance, and participation in all phases of pharmaceutical activities.

The American Association of Colleges of Pharmacy needs a continuity of effort which I believe can only mature through the establishment of a full-time executive secretary and editor, either one or two persons, as funds and talents dictate. Ideas and new developments can and must continue to come from the individual college members, the elected officers, special and regular committees, as well as through district meeting recommendations. The full-time secretary would serve as a "foci" for continuity of effort, for historic record, for organization. He would serve as the contact officer for the Association, and would properly, promptly, and propitiously direct and organize pharmaceutical education's impact upon other facets of pharmacy.

Pharmaceutical education is omitted from far too many pharmaceutical, as well as medical and public health, projects, meetings, and considerations because there is no *one* individual to serve as our advocate. If pharmaceutical education is the foundation of *all* things pharmaceutical, then it's time for our organization to assume its proper position in the pattern of pharmaceutical progress.

The Association of American Medical Colleges has a paid staff as well as a building of its own. Its total budget is currently considerably higher than ours, and its constituent fees are five times those currently paid by our members. Its budget is not solely dependent upon contributions from its members. The Association of American Medical Colleges requests and does obtain research grants and some funds from foundations. The American Association of Dental Schools is, effective January, 1959, establishing an office in Chicago which will be its headquarters and which will be under the direction of a full-time secretary. Its college dues are also considerably higher than those of our Association.

We must discuss ways and means of covering the cost for a more formidable organization for the American Association of Colleges of Pharmacy. The future of pharmaceutical education is our responsibility, and it is up to us to establish a strong, functional, and productive organization. To do this we can no longer depend solely upon the gratuities of our teaching and academic personnel. The duties of the office of secretary, as well as the current duties of the office of the chairman of the executive committee, require the time and energy as well as talents of an individual who can direct his total effort toward our future progress. The American Association of Colleges of Pharmacy has been fortunate to have had so many who could and who were permitted to share their time and abilities for the continued development of our Association. There must be a rudder of continuity for our ship. We must have a port which we may call home.

Louis C. Zopf

Whatever may be the cost, more adequate funds must be provided for training doctors, surgeons, pharmacists, nurses. There is a wide gap between our capacity for medical service and what people are able to obtain.

S. V. Sanford, Am. J. Pharm. Ed., 3, 440 (1939)

EDITORIAL

There will be a lot of scrambling among congressmen for headlines in the next few months, and one of the easiest ways to get them is to investigate something. This year it probably will be the pharmaceutical industry. These investigations sometimes can be as prolonged as a soap opera and as noisy as a Chinese New Year. Somebody usually gets hurt. Let's hope it's not the health of the world that gets thrown into the grist mill of political exploitation.

It seems the whole government concern over the drug industry was kicked off over five years ago by a Republican chairman of the Federal Trade Commission who thought he paid too much for some antibiotics for a sick member of his family. During the closing sessions of the last Congress, the Federal Trade Commission's antibiotic report and complaint against five pharmaceutical houses was made a government and public issue. On the floor of the Senate, Senator Yarborough (Texas) was sponsoring a proposal for a greater increase in social security benefit payments than the 7 per cent approved by the House. In his unsuccessful attempt to raise the 7 per cent to 10 per cent he told the Senate that the average cost of prescriptions had increased from seventy-five cents about twenty-five years ago to a cost of from two to five dollars today, contending that because of high drug costs old people on social security were unable to buy proper food.

Senator Magnuson (Washington), Chairman of the Senate Interstate Committee, agreed with Yarborough, saying that the FTC report "proved" that prices charged for drugs were "exorbitant."

It looks as though we need to expand our educational function to the U.S. Congress. Some of its members seem not only to be poorly informed but also to be in a dangerous position to transform their unenlightenment into a snowballing fiasco of legislation which may landslide itself through the whole pharmaceutical profession and the health of the world.

Pharmacy's voice in government circles has been in the past and is now too weak and misdirected. The A.Ph.A. has tried to represent the profession but seems to be hamstrung by a lack of staff and money. The NARD is so blinded by the fair trade issue its effectiveness as a force to influence the government for any other purpose seems to me to be seriously impaired for years to come.

Now is the time that a spokesman for pharmaceutical education could work hand and glove with the A.Ph.A. to promulgate a campaign of education among our members of Congress. *But who's going to do it?* We have no permanent offices for the AACP. The work of the Association is done as a service by already-too-busy educators. The manufacturers will fight the misunderstanding of some congressmen, but they are naturally in a position which will pre-prejudice their case. It seems to me, however, that *individual educators could make a voice heard that would have meaning.*

With the help of the Health News Institute, I have prepared and sent to Senator Magnuson a file of material and a long personal letter expressing my feelings regarding this issue. It will take much such factual education to impress on the members of Congress that when they deal with the pharmaceutical profession in this country they are dealing with a vital force which works for the

good of the health of mankind, and a serious interference with its processes may lead to disastrous effects on the health of the people of this country and the world at large.

Many people say drugs cost too much. But the same people say food costs too much, and cars cost too much—on the subject of taxes they turn three shades of purple and shoot sparks! We will see how the Congress "investigates" *taxes* this year. But leave the taxes to someone else to talk about; we should be interested first in fighting pharmaceutical battles. As for the high cost of prescriptions, from 1936 to 1956 the annual increase in the medical-care index has averaged 4 per cent compared with 8.5 per cent for hospital care, 3.4 per cent for doctor's fees, 5 per cent for food, and *only* 2 per cent for prescriptions and drugs. In 1939 Americans spent 0.87 per cent of their income left after taxes for drugs. In 1954, despite antibiotics selling for fifty cents a dose and other high-priced drugs and despite an increase in the average prescription price from ninety-one cents to two dollars and twenty-seven cents, the percentage of income spent for drugs dropped to 0.64 per cent, about one-fourth less. This comes to about three-fifths as much as the amount spent by the average American for radio and television; about the same as the cost of cosmetics and toilet articles; roughly one-fourth the amount spent for tobacco.

But to discuss the *cost* of drugs is only a small part of the picture. One must also discuss what drugs do. The statistics regarding pneumonia are often quoted, but such statistics still give an eye-opening example of the advance of therapeutics. Twenty years ago a case of lobar pneumonia meant five weeks in a hospital and a long convalescence with many weeks' wages lost. Furthermore, it cost about three months' wages to pay the hospital bills and other expenses of treatment. Today a case of lobar pneumonia means two weeks of illness, usually at home, and an immediate return to work. The cost: about five hours' wages. Also, twenty years ago one in four pneumonia cases died; today death from pneumonia is rare. And other impressive comparisons show that the rate of paralytic poliomyelitis has been cut 80 per cent in four years; infant mortality has been cut from 58.2 to 3.9 per cent per 10,000 live babies during the same period. Life expectancy at birth, which has increased from forty-seven years in 1900 to over sixty-nine years in 1956, had increased almost ten years since 1937 alone. In 1900 the third largest cause of death was given as gastrointestinal disorders. The death rate now has declined 96 per cent.

And what is more astounding to most laymen is the realization that 70 per cent of all prescriptions today are for drugs discovered in the past ten years. This alone should convince any senator or congressman that a comparison of today's average prescription price with an average prescription price of twenty-five years ago is like comparing an Atlas missile with a boomerang!

Unless pharmaceutical educators and pharmacists everywhere take the time and effort to engage enthusiastically in the task of informing the public and Congress of what is going on in the pharmaceutical industry, I'm afraid their gross ignorance may severely hamper the growth of the pharmaceutical profession. There are still people who believe in the movie version of scientific discovery: an overworked physician who after hours makes momentous discoveries in his backyard, homemade laboratory. Thirty years ago university laboratories were almost the only places where chemical discoveries were made. Today most new drugs are discovered in the laboratories of pharmaceutical manufacturers, and all drugs there find themselves being perfected and made ready for

large-scale manufacture. The drug industry today employs about 35,000 researchers. Several pharmaceutical houses have 500 or more researchers each; one has nearly 1,000. In 1957 the drug industry spent about $127,000,000 in research and produced more than 500 new drug compounds. Most people will not understand the magnitude of the research in the pharmaceutical industry until you tell them such things as the following: Lederle Laboratories invested $6,000,000 and sifted through over 100,000 molds before finding Aureomycin; over 5,000 sulfa drugs were formulated and tested only to be discarded as not completely satisfactory; E. R. Squibb & Sons and Hoffmann-La Roche independently tested 8,000 compounds to track down Isoniazid, the antituberculosis drug which played a major part in closing several major tuberculosis sanitariums and emptied some 3,200 hospital beds within two years. Obviously such discoveries are *not* the result of flashes of genius or chance discoveries. One manufacturer has commented that his company is overjoyed if one out of every thousand compounds tested proves to be a good drug.

It should impress any congressman and most laymen (particularly the pork-barreled farmer) that no government appropriation guarantees the drug industry a profit or even the recovery of his investment. Drug manufacturing is an extremely competitive business. Every company is out to make the other company's product or its own product obsolete. World War II saw the bottom drop out of the sulfonamide market. Broad spectrum antibiotics have in many instances replaced penicillin. Refinements of molecular structure and forms of administration bring greater effectiveness to drugs each year.

But all is not onward and upward either. About five years ago as the result of adverse publicity for Chloromycetin, Parke, Davis sales dropped in a few months from $1,000,000 a week to $100,000 a week. But Parke, Davis withstood the storm and is back stronger than ever as a top-flight pharmaceutical company with no one else to credit but itself. It should be refreshing for any taxpayer to know that a company whose existence is important to the public welfare got back on its feet without going to the government for a handout.

Furthermore, the drug industry always stands ready to act in the public good when it is called upon. The astounding feats of production of antibiotics during World War II are overshadowed only by the almost miraculous production of polio vaccine in a matter of months. The crash program to prepare an Asian flu vaccine, among many other examples, attests to the tremendous contribution made by the manufacturing industry for the common good to humanity.

The detractors will say that the pharmaceutical industry is well paid for its work and that it makes too much money. Let's look at that too. The more than 1,100 companies in 1957 took in about 1.6 billion dollars, yet the largest company accounted for only about 12 per cent of that total. In contrast General Motors accounted for about half of the multibillion-dollar automobile industry. A financial magazine recently tabulated the earnings of seven leading drug firms —Abbott, Lilly, Merck, Pfizer, Smith Kline & French, Schering, and Parke, Davis. Over the five years (1952 through 1956), the average profit of these companies computed before taxes, interest, depreciation, and certain other items was 26.2 cents per dollar of sales (the government took about half of this). Comparing this figure with the four largest U.S. corporations—General Motors, du Pont, Standard Oil of New Jersey, and U.S. Steel, on the same basis—their pretax profit was nearly the same—24.7 cents per dollar of sales.

The pharmaceutical manufacturers can stand any investigation by anyone. But I think it is up to all of us to see that it's an *informed* investigation. Government interference in drug discovery and manufacture could be extremely serious. I need only to quote from *Doctor and Patient in Soviet Russia* by Mark G. Field to illustrate that statement:

> Manufacturing takes place in state enterprises and is subject not only to the overbureaucratization and constrictive red tape that often plagues Soviet industry but also to the low priority order reserved for the medical field. Most pharmaceuticals are manufactured either under the supervision of the Health Ministry or by contract with other organizations. In 1946 a separate Ministry of the Medical Industry was created in the hope of improving the process. Apparently this did not improve matters and at the present time manufacturing is again under the supervision of the Health Ministry and supervised by a Chief Pharmaceutical Administration . . .
>
> The shortage (and also the high cost) of pharmaceuticals is one of the perennial problems that plagues the physician in his attempt to cope effectively with illness. He knows that a patient requires a certain drug, but also realizes that it may not be available in the pharmacy, or if it is, that the cost for the patient may be prohibitive . . .
>
> . . . Thus, at the Conference of Tadzhikistan's medical workers it was remarked that in certain drugstores one cannot obtain even the simplest medicines which are in wide demand by the population. "I am not afraid to make a mistake in a prescription," bitterly remarked the chief physician of the Shaidansk Hospital, I. A. Schaterovschvili. "In our drugstore they prepare only two or three types of remedies, and for the last two years I have been prescribing to my patients only one and the same kind."
>
> In countless letters and articles, both patients and physicians complain of the unavailability, the poor quality and sometimes the high prices charged for pharmaceuticals. . .
>
> . . . The Soviet lay and medical press have also concerned themselves of late with mounting cases of irregularities and embezzlements in the pharmaceutical administration. Through certain bookkeeping operations the cost to the patient is doubled; in other instances only expensive drugs are produced and stocked, whereas standard items remain unavailable. At the same time new drugs which are heralded as achievements of Soviet science do not go into production fast enough. Thus on December 16, 1952, *Pravda* itself took up the problem in its leader, stating that the Health Ministry of the USSR "exhibits many flagrant examples of the incorrect attitude toward the broad dissemination of the achievements of science. The slowness in the preparation of new effective medical preparations is intolerable." These deficiencies in the production and distribution of pharmaceuticals considerably increase the handicaps under which the Soviet physician must work. In many cases they paralyze his efforts and are detrimental to the society's ability to meet the threat of illness.

When pharmaceutical education needs a helping hand, it turns to the pharmaceutical manufacturers. It usually gets helped. Some of us still raise our eyebrows at the discrepancy between what is given medical education and what is given pharmaceutical education. Nevertheless, it *is* the *pharmaceutical* manufacturing industry, and we should be willing and proud to be associated with it and not only share its beneficences but help it when it needs the help we can give. In our classrooms as well as to the laymen and the congressmen we must with documentation convey an appreciation for the pharmaceutical manufacturer. And I mean the *true*, first-line manufacturer, not the copier! If in the months and years ahead our small role in extending education beyond the ivy-covered walls of our institutions brings assistance to a segment of our profession under fire, it will have been time well spent in a cause the worthiness of which none of us can deny.

Melvin R. Gibson

ANNOUNCEMENTS . . . . . .

Instructions to Authors. Manuscripts submitted to the Editor, reports to be published, and articles presented to the sections of the Conference of Teachers should conform to standard specifications. All material submitted for publication should be prepared in a manner that eliminates undue editorial changes. Material must be typewritten with double spacing on one side of paper 8.5″ x 11″ in size and with 1″ to 1.5″ margins, and submitted in original and one carbon. All pages should be numbered consecutively.

For all material, except reports of committees, delegates, and officers, the title on the first page should be followed by the author's name without reference to institution of affiliation, title, or degree. Attached to the article should be a separate sheet of paper which indicates the title of the paper, the author, his position, his highest academic degree, the name of the institution from which he attained this degree, and his major field of interest and/or specialization relating to the content of the article.

Reports of officers, delegates, and committee chairmen to be submitted for publication should be headed by the official name of the contributor's office, unit, or committee. The Association name is not necessary in such a heading. At the end and on the last page of the report should appear the name of the officer, delegate, or committee chairman. No biographical information is required for individuals submitting such reports.

In all articles, except reports, center sub-headings must be used when appropriate. These should not be numbered. Literature citations should be numbered immediately following reference and should be numbered consecutively in order of appearance in manuscript. These numbers should be full-sized Arabic numerals enclosed in parentheses. Subsequent citations to the same reference should be indicated by the original number assigned. References to footnotes throughout the text should be numbered consecutively by superscript Arabic numerals, but such references in a table should be designated by superscript lower case letters beginning with "a." Literature references should be grouped at the end of the article under the heading "References" and in sequence of appearance in the text. These should be preceded by the appropriate reference numbers in parentheses. The names of all periodicals cited in the list of references must be abbreviated in accordance with abbreviations given by *Chemical Abstracts* in its "List of Periodicals Abstracted." Citations of periodicals and books should follow the form required by the *Scientific Edition, Journal of the American Pharmaceutical Association*. *Webster's New International Dictionary* is used as the authority for spelling and use of terms. *A Manual of Style* (University of Chicago Press) is the authority for form.

Numbers of less than three digits should be written in words. Numbers of three or more digits should be written in Arabic numerals unless occurring at the beginning of a sentence, in which case the numeral should be spelled out. Periods of time should be written in words. Decimal numbers should always appear in figures as well as all numbers expressing per cent.

The following words should be capitalized: the word *committee* when referring

to a specific committee, officer's titles and the word *association* when referring to the American Association of Colleges of Pharmacy and its officers, the name of a specific department of a specific school, and terms *college* and *school* when specific ones are meant. The following words should not be capitalized: areas of study, academic and equivalent titles unless they precede directly the individual's name or are in apposition, class names, and course names.

Film titles should be underlined to indicate printing in italics. Abbreviations of organizations where the abbreviation is all capital letters should not have periods nor spacing (Example: AACP, AFPE, but A.Ph.A.).

Well-prepared glossy photographic prints are accepted in a limited number. The budget of the *Journal* allows in each volume a limited number of cuts which are printed at no cost to the authors. If the *Journal* is not able to include an author's cuts because of budgetary limitations, the author or the institution represented may pay for such cuts to be included.

Authors wishing to retain photoengravings of illustrations or original drawings and photographs must indicate this desire when returning proofs. Engravings, drawings, and photographs for which no requests are received will be destroyed after each issue of the *Journal* is published.

Photographs should be submitted in envelopes properly padded to prevent damage. All figures submitted must be referred to in the text of the manuscript and should be numbered consecutively with Arabic numerals, e.g., Fig. 1, Fig. 2, etc. Titles of figures should be typewritten on separate pieces of paper. Figure numbers corresponding to titles should be *lightly* written in one corner on the back of the prints.

The number of tables submitted should be kept to a minimum. They should be constructed to occupy no more than the width of the page, seventy type-characters and spaces for regular type and eighty-five for reduced type. Committee reports of the Association will be printed in reduced type. All tables should be referred to in the text of the manuscript at the appropriate point of inclusion, and should be numbered in Roman numerals. The table number and title should be placed in a heading above the table.

The *Journal* maintains a limited staff; hence, all material not conforming to the above specifications will be returned to authors for correction.

Authors should read galley proofs carefully and compare them with the manuscript. All editorial questions, either in the manuscript or proof, should be carefully answered.

In making changes in galley, authors should bear in mind that changing the length of any line will probably necessitate resetting the remainder of the paragraph. A corresponding condensation or addition can often be made to preserve the original length of the line. Excessive changes in proofs will be charged to the author.

Reprints may be obtained at the prices quoted each author when proofs are delivered. Reprints must be ordered when the galley proofs are returned by the author. If reprints are not ordered at that time, it will be understood that no reprints are desired.

The Editor will be glad to answer any questions authors may have concerning the specifications indicated above .

NEW LITTLE PEOPLE . . . . . .

Richard Michael Theodore—born November 25, 1958, to Mr. and Mrs. Joseph Theodore, New England College of Pharmacy.

Claudia Ann Thomasson—born December 8, 1958, to Dr. and Mrs. C. L. Thomasson, Southern College of Pharmacy.

Manuel Harry Newburger—born October 21, 1958, to Mr. and Mrs. Jarold Newburger, Temple University.

Debra Ann Malewitz—born November 16, 1958, to Dr. and Mrs. Thomas D. Malewitz, University of Florida.

Mark Raymond Buday—born October 23, 1958, to Dr. and Mrs. Paul V. Buday, Fordham University.

Gail Theresa Eugere—born October 24, 1958, to Dean and Mrs. Edward J. Eugere, Texas Southern University.

Ralph N. Ferguson, II—born December 15, 1958, to Mr. and Mrs. Ralph N. Ferguson, Texas Southern University.

MARRIAGES . . . . . .

Miss Mary Ann Arnette, Director of Pharmacy Extension Service, University of Texas, to Mr. Gary G. Heyland, December 21, 1958.

The ancient legend that Asclepius had been killed by a thunderbolt at Zeus' hands for having accepted remuneration for the resuscitation of a man is very revealing of the Greek conception of a physician's duty.

Michael Ginsburg, Am. J. Pharm. Ed., 6, 8 (1942)

STAFF CHANGES

NEW STAFF MEMBERS

University of Tennessee. Dr. Seldon D. Feurt has been appointed dean of the School of Pharmacy effective March 1. Dr. Feurt previously held the title of professor of pharmacology at the University of Georgia. Dr. Clinton B. Nash has been appointed assistant professor of pharmacy. Dr. Nash received his Ph.D. degree with a major in pharmacology from the University of Tennessee. He was formerly group leader in cardiovascular pharmacology at the research laboratories of Mead, Johnson and Company. Mrs. Elsie G. Jourdan has been appointed instructor of pharmacy. Mrs. Jourdan received her B.S. degree from the University of Tennessee and was formerly pharmacist at St. Joseph Hospital in Memphis. Mr. Charles N. May has been appointed instructor of pharmacy. Mr. May received his M.S. degree in hospital pharmacy from the University of Tennessee and was formerly a pharmacist in the U.S. Public Health Service.

Southwestern State College. Dr. Howard E. Mossberg of the University of Florida has been appointed associate professor of pharmacology. He replaces Mr. George Beckloff who has resigned to enter the University of Oklahoma School of Medicine.

Howard University. Mr. James N. Tyson has been appointed instructor of pharmacy. Mr. Tyson recently received his master's degree in hospital pharmacy from the University of Buffalo.

Xavier University. Mr. Marvin Powers has been appointed instructor in pharmacology. Mr. Paul Sacco has been appointed assistant professor of botany and pharmacognosy.

University of Pittsburgh. Dr. Mario D. Aceto has been appointed instructor of pharmacology. Dr. Aceto received his Ph.D. from the University of Connecticut.

CHANGES IN STAFF TITLES

University of Illinois. Dr. James E. Gearien has been appointed professor of chemistry and head of the department effective January 1. Since September, 1958, Dr. Gearien has been acting assistant dean.

Philadelphia College of Pharmacy and Science Dr. Louis A. Reber has been promoted to professor of analytical and physical chemistry. Dr. Grafton Chase has been promoted to associate professor of chemistry; Dr. Constantine A. Apostolides has been promoted to associate professor of botany. Dr. Warren S. Chernick has been promoted to assistant professor of physiology. Mr. Lewis J. Kleckner has been promoted to assistant professor of chemistry.

Temple University. Dr. Samuel Elkins has been promoted from instructor of chemistry to assistant professor.

Xavier University. Mr. Emile LaBranche has been promoted from assistant professor of pharmacy to associate professor. Mr. Warren McKenna has been promoted from instructor of pharmacy to assistant professor. Dr. Ludmila Stass has been promoted from assistant professor of pharmacy to associate professor. Mr. Charles J. Kelly, Professor of Pharmaceutical Chemistry, has been elected dean of the lay faculty of the University and will serve on the administrative council of the University.

University of Pittsburgh. Mr. Ralph N. Blomster has been promoted from graduate assistant in biological sciences to instructor.

. . . the public wants its pharmacist to be a professional man in action as well as in name and insists that a proper sense of proportion between professional and commercial activities be maintained.

Charles H. Rogers, Am. J. Pharm. Ed., 5, 315 (1941)

GENERAL NEWS

Feurt named dean. Dr. Sheldon D. Feurt, Professor of Pharmacology, University of Georgia, has been appointed dean of the University of Tennessee School of Pharmacy.

Dean O'Connell dies. Dr. C. Leonard O'Connell, Dean Emeritus, School of Pharmacy, University of Pittsburgh, died September 2, 1958 at the age of sixty-eight.

Smith receives grant. A $7,500 National Science Foundation faculty fellowship has been awarded to Charles H. Smith, Assistant Professor of Chemistry, University of Tennessee School of Pharmacy, to permit him to complete work on his doctorate in organic and pharmaceutical chemistry. He has been given a leave of absence of one year to take study at the University of Mississippi.

Johnson receives grant. Dr. William E. Johnson, Associate Professor of Pharmacology, University of Wyoming, has received a $2,000 research grant from the National Institutes of Health for research on the pharmacology of some new beta—(2-furyl) alkylamines. The work is in cooperation with Dean David W. O'Day and Dr. Raymond J. Kahl, Professor of Pharmaceutical Chemistry.

Minnesota receives grant. The University of Minnesota College of Pharmacy has received a grant of $76,032 from the U.S. Public Health Service to provide space and facilities for research. This sum will be matched with funds from a larger legislative appropriation intended to "rehabilitate" Appleby Hall for the exclusive use of the College of Pharmacy. The new quarters will provide almost twice the floor space of the present Wulling Hall.

New journal. The first issue of a new abstracting journal, *World-wide Abstracts of General Medicine*, appeared in October, 1958. This journal is published by the Excerpta Medica Foundation and is distributed on a controlled circulation basis by Warner Chilcott Laboratories; the editors are Dr. Morris Fishbein and Dr. M. W. Woerdeman. Each issue will contain, in addition to abstracts, one review article by an authority in the field; the first such review article is by Dr. Paul Dudley White. The articles abstracted are selected from a wide variety of journals; abstracts are informative, unsigned, and grouped under broad headings. The first issue contains forty-five abstracts.

New program at PCP. Philadelphia College of Pharmacy and Science has inaugurated a cooperative program in which scientists from industry participate in graduate student instruction at the college. The first phase of the new program began this semester with a course in the chemistry of medicinal agents taught by Dr. Peter B. Russell, Technical Director of the Research and Development Division of the Wyeth Laboratories. In the second semester a team of thirteen research scientists from the Smith, Kline and French Laboratories will present a fifteen-week series of two-hour lectures on medicinal chemistry. The topics and lectures in this series, which was organized by Dr. Glenn E. Ullyot, Associate Director of Research of the Laboratories, are as follows: "Survey of Medicinal Chemistry," Dr. Ullyot; "Cholinergic and Anticholinergic Drugs," Dr. Manfred Wolff; "Sympathomimetic Agents and Central Nervous System Stimulants," Dr. Carl Keiser; "Central Nervous System Depressants," Dr. Charles L. Zirkle; "Analgesic Agents," Dr. Paul N. Craig; "Anesthetics," Dr. Richard Mohrbacker; "Hypotensive Drugs," Dr. Ullyot; "Cardiotonic Agents and Coronary Dilators," Dr. James W. Wilson; "Steroids" (two lectures), Dr. James F. Kerwin; "Antihistaminic Agents," Dr. Bernard Loev; "Antiviral Agents and Cancer Chemotherapy," Dr. John Hoover; "Diuretic Agents," Dr. Joseph Weinstock; "Plants as Sources of Drugs," Dr. Irwin J. Pachter; "Tracers in Medicinal Chemistry," Dr. Maxwell Gordon.

New Kappa Psi chapter. On October 25, 1958, the Gamma Lambda Chapter of Kappa Psi was installed at the New England College of Pharmacy.

Baron visits Rhode Island. Dr. Christian C. Baron, biochemist and member of the Department of Biochemistry of the Faculty of Science, University of Dijon, France, was a guest of the College of Pharmacy, University of Rhode Island. He presented a one-hour seminar, "The Biochemistry of the Amniotic Fluid," before faculty and students. Dr. Baron had toured the United States and attended a meeting of the International Council of Scientific Unions as a representative of the chemistry and biology section of France.

Kappa Psi chapter transfers. Dr. Pierre F. Smith, Grand Vice-Regent representing Alpha Chapter, the National Headquarters of Kappa Psi Pharmaceutical Fraternity, presented a new charter to Beta Epsilon Chapter in accordance with their official transfer from the former Rhode Island College of Pharmacy and Allied Sciences

in Providence to the College of Pharmacy, University of Rhode Island, Kingston. Professor N. W. Fenney, Editor of *The Mask;* Professor W. R. Williams, Grand Historian, representing Connecticut; and Dr. J. W. Schermerhorn, Grand Counselor, representing Massachusetts, were in attendance at the ceremonies.

Carr at Rhode Island. Dr. C. Jelleff Carr, co-author of the well-known textbook *Pharmacologic Principles of Medical Practice* and Senior Pharmacologist at the Psychopharmacology Service Center of the U.S. Public Health Service, spoke before the First Annual Pharmacy Clinic at the University of Rhode Island.

Rhode Island cooperative research. Experiments to find better drugs to stop heart action so that satisfactory operations on the heart can be performed are being made at the University of Rhode Island Department of Pharmacology in cooperation with the cardiac-pulmonary department of Miriam Hospital, Providence. Dr. George J. Cosmides and Dr. John J. DeFeo are cooperating with Dr. Nathan Kiven, Clinical Director of the Cardiac-Pulmonary Laboratory of Miriam Hospital; Dr. John Yasher, Cardiac Surgeon; Dr. Johannes Virks, Resident in Medicine, and Dr. Oswald Velis, Fellow in Cardiology, all of Miriam Hospital. The project is being aided by a $4,000 federal grant and a $6,000 grant from the Rhode Island Heart Association.

Youngken receives cup. Dr. Heber W. Youngken, Jr., Dean of the College of Pharmacy, University of Rhode Island, was presented with the John C. Weldin Scholarship Cup by the Kappa Psi Pharmaceutical Fraternity. The fraternity received the highest collective scholarship average among all dormitories and fraternities at the University. Dean Youngken announced that a pharmacy student, Miss Susan Hirsch, attained the highest individual scholastic average on the University of Rhode Island campus.

Kansas City receives grant. The School of Pharmacy of the University of Kansas City has been awarded $8,000 by the Atomic Energy Commission. This money will provide additional equipment to increase teaching facilities in the field of radioactivity. A new laboratory will also be made available for this purpose.

Dr. Sawyer dies. Dr. John R. Sawyer, Vice President of the Massachusetts College of Pharmacy, died on November 25, 1958. Dr. Sawyer was a former member of the Massachusetts State Board of Pharmacy and past president of the Boston Druggists' Association.

Lakeside sponsors research. Lakeside Laboratories is sponsoring a research project at Massachusetts College of Pharmacy for the year 1959. The project is a pharmacological investigation of a new compound. The research group, directed by Dr. Howard J. Jenkins, is concentrating its efforts in cardiovascular, antispasmodic (anticholinergic), antihistaminic, and analgesimetric areas of investigation.

Lynn Index addition. Monograph III in the Lynn Index series, a bibliography of phytochemistry edited by Dr. John W. Schermerhorn and Dr. Maynard W. Quimby, has recently been published. The monograph includes the following families of the order *Scitamineae*: *Cannaceae, Marantaceae, Musaceae,* and *Zingiberaceae.*

New MCP scholarships. Two substantial scholarship funds have been established at the Massachusetts College of Pharmacy by the E. L. Patch Company of Stoneham and by United Consumers, Inc. The scholarships are to be awarded annually.

Schermeister studies. Dr. Leo J. Schermeister, Professor of Pharmacognosy, North Dakota Agricultural College, was at Oak Ridge, Tennessee, during the month of January, 1959, for instruction in the field of radioisotope tracer techniques. Dr. Schermeister is the third staff member of the School of Pharmacy to attend this school.

Burt reports to A.Ph.A. Dean Joseph B. Burt of the University of Nebraska reported to the A.Ph.A. House of Delegates on the Seventeenth General Assembly of the International Pharmaceutical Federation held at Brussels, Belgium, September 8-15. Dean Burt headed the United States delegation.

Burt at Kansas City. Dean Joseph B. Burt of the University of Nebraska appeared as a speaker on the program of the pharmacy seminar sponsored by the Alumni Association of the School of Pharmacy of the University of Kansas City.

Burt at Pittsburgh. Dean Joseph B. Burt attended a meeting of the Board of Visitors of the Schools of the Health Professions of the University of Pittsburgh on December 1. The Board consists of twelve members selected from various fields of activity in the health professions who have been appointed by Chancellor E. H. Litchfield to serve in an advisory capacity to the University in matters of policy concerning the medical center and the Schools of the Health Professions.

Texas receives grant. Dean Henry M. Burlage of the University of Texas recently announced that the Gustavus and Louise Pfeiffer Research Foundation of New York has awarded a grant of $3,000 annually for three years in support of the pharmacy extension program.

Kaufman appointed. Dean Karl L. Kaufman of Butler University has been appointed General Chairman of the National Science Fair to be held in Indianapolis in 1960. It is anticipated that there will be about 400 exhibitors from all parts of the United States and from a few foreign countries.

TV used at Arizona. The University of Arizona television station was recently completed, and the use of television for classroom instruction was initiated. The first closed-circuit program was held in conjunction with a laboratory class in pharmacology for senior pharmacy students. A demonstration by Professors Albert Picchioni and Lincoln Chin of the technique involved in the direct recording of blood pressure in the rat was viewed on television screens. With the aid of television one demonstration was adequate for the entire class as compared with the previous need for repeated demonstrations of the techniques for small groups of students. The students claimed that they could see better and proved this by duplicating the procedure in the pharmacology laboratory with more proficiency.

Childs receives grants. Mr. Richard Childs, Instructor of Pharmacy, University of Arizona, was recently awarded a grant by the U.S. Public Health Service to complete the development and testing of a small animal F.M. electrocardiographic telemeter. He also received a fourteen-month National Science Foundation Faculty Fellowship for doctoral studies.

Jeffries to new post. Mr. S. B. Jeffries has been named executive vice president of Sang and Pollak Drug Service Company, wholesale house headquartered in Brooklyn, New York. Mr. Jeffries was formerly trade and professional relations manager of the Family Products Division of Warner-Lambert Co. Before that, he was on the pharmacy administration staff of Brooklyn College of Pharmacy.

Rho Chi officers. Dr. Louis W. Busse, Associate Dean, School of Pharmacy, University of Wisconsin, was elected national vice-president and Dr. Edward J. Rowe, Professor of Pharmacy, College of Pharmacy, Butler University, was elected national secretary-treasurer of Rho Chi Society in the recent mail ballot of the chapters. These officers-elect will be installed at the close of the 1959 convention to serve two-year terms.

SKF lab in Great Britain. Smith, Kline & French Laboratories has announced the establishment of an independent research organization in great Britain to supplement the firm's own extensive Research and Development Division in Philadelphia and—of equal importance—to provide the company with a direct link to European science.

The new Smith, Kline & French Research Institute of Great Britain will be headed by Professor William A. Bain, who has held the Chair in Pharmacology at the University of Leeds since that post was created in 1946. He will guide a staff of forty.

Smith, Kline & French said the establishment of a research organization on the Continent has been under study since the early 1950's. SKF has long been a leader in scientific exchange programs, and, for example, initiated early this year the first official exchange of pharmaceutical and medical research personnel with the Soviet Union.

In 1955, the decision was made to locate the overseas research organization in England. This decision was given impetus in 1956, when Smith, Kline & French purchased the London firm of A. J. White and established its British subsidiary. Although the research institute will be housed in a new SKF Laboratories Ltd. building being constructed near London, the institute will report to W. Furness Thompson, Vice President of the Research and Development Division, headquarters in Philadelphia. Research leads will be turned over both to SKF in Philadelphia and SKF Laboratories Ltd. in England. Currently the British subsidiary conducts a limited program in product-development research.

KE booklet. In 1951 Kappa Epsilon, a national professional fraternity for women in pharmacy, published the first booklet to describe the role of women in pharmacy. *Women in Pharmacy* was so well received that the supply was soon exhausted. A new and enlarged booklet entitled *She Is A Pharmacist* has been written by Dr. Eunice Bonow, Assistant Professor of Pharmacy at the University of Wisconsin-Milwaukee, and has recently been published by Kappa Epsilon. *She Is A Pharmacist* relates the experiences of Elizabeth Doty, a high school senior as she visits with Miss Brady, the owner of a community pharmacy; Mrs. Harrison of a prescription pharmacy; Miss Lunde, chief pharmacist at City Hospital; Miss Randolph of the Pharmacal Laboratories, Inc.; Dr. June Whyte of the pharmacy faculty of the State University; Miss Kerns, a pharmacist-intern; and Mrs. Asbury, a relief pharmacist. To complete the account, a sketch of Elizabeth Marshall, who is believed to have been the first woman pharmacist in the United States, is included. *She Is A Pharmacist* is available from Dr. Eunice Bonow, 600 W. Kilbourn Ave., Milwaukee 3, Wisconsin, at twenty cents per copy.

PCP dedication. The recently completed Women's Residence Hall at Philadelphia College of Pharmacy and Science housing forty-two students was formerly dedicated October 28 in memory of Mr. Mahlon N. Kline, a former trustee.

PCP receives grant. Philadelphia College of Pharmacy and Science has received for its School of Chemistry a grant of $27,400 from the National Science Foundation to support a summer institute in radiochemistry for high school and college science teachers.

MCV staff receives grant. Dr. Walter H. Hartung, Dr. John Andrako, and Dr. J. Doyle Smith of the Medical College of Virginia Department of Chemistry and Pharmaceutical Chemistry have received a grant from the National Institutes of Health to study "Asymmetric Hydrogenations with Palladium Catalysts." Mr. Robert L. Beamer will be working on this project also. These investigators also have received a grant from the same source to study "Synthesis of Succinic Acid Derivatives."

Hartung on committee. Dr. Walter H. Hartung of the Medical College of Virginia is serving on an ad hoc committee on nomenclature for food additives in connection with the new amendment to the Food, Drug, and Cosmetic Act.

Conference at Temple. The Twenty-fifth Annual Career Conference of Temple University attracted more than 1,500 students representing seventy high and preparatory schools in Pennsylvania, New Jersey, Delaware, and Maryland. The conference was held on November 15, and students were addressed by a staff of experts in forty vocations.

Eby elected. Dr. Frank H. Eby, Professor of Botany and Pharmacognosy, Temple University, has been elected national president of the Professional Interfraternity Conference. He is the first conference officer to represent the profession of pharmacy. Dr. Eby is secretary-treasurer of Kappa Psi Fraternity.

Kappa Psi chapter at South Dakota. The Gamma Kappa Chapter of Kappa Psi National Pharmaceutical Fraternity was established on the South Dakota State College campus, October 17, 1958. Dr. Milton L. Neuroth of the Medical College of Virginia, who is Grand Regent of Kappa Psi, was the installing officer.

St. John's dedication. Science-Pharmacy Hall was dedicated November 6, 1958, on the Long Island campus of St. John's, Hillcrest, Jamaica. The building will accommodate approximately 2,500 students at one time and is one of the largest in the East, providing approximately 160,000 square feet of floor space. C-shaped in structure, it is 315 feet long, 65 feet wide in the center, with wings 159 feet long by 65 feet wide. It consists of five full floors and a penthouse and will serve for both undergraduate and graduate work, for student and faculty research in biology, chemistry, microbiology, physics, and the various branches of pharmacy. It includes a student lounge, locker rooms, a periodical reading room, administrative offices, a cafeteria, and a kitchen. A greenhouse and several animal rooms are located in the penthouse.

Pharmacy enrollment. This report covers the registration of all students in schools and colleges of pharmacy in the continental United States and also two AACP member colleges outside the United States—the University of the Philippines and the University of Puerto Rico. The figures are for registration of students during the first semester, quarter, or term of the 1958-1959 school year. The tabulation of the undergraduate enrollment is given for each school or college in the eight districts composing the United States, for our seventy-four member colleges, two non-member colleges, and the enrollment at the University of the Philippines and the University of Puerto Rico. The statistics are broken down into detailed 1958-1959 statistics, and for comparison totals for 1957-1958 are given.

The enrollment report for all colleges in the continental United States shows a total of 17,264 students in 1958-1959 as compared with 16,571 students in 1957-1958. This is an increase for this academic year of 693 students or 4.2 per cent. Only Districts V and VIII show decreases in enrollment.

This is in keeping with recent statistics compiled by the United States Office of Education in which early statistics show a 5 per cent-plus increase for the enrollment in all colleges.

The total number of women represented in the enrollment of the seventy-six continental schools is 2,115 or a 7.7 per cent increase over 1957-1958. The University of the Philippines and the University of Puerto Rico show 320 students registered in 1958-1959 as compared with 373 in 1957-1958—drop of 53 students or 16.5 per cent.

It is interesting to note that of our seventy-six continental schools, nine are on the four and five year program, eleven are on the five year program, and only two are on the six year program. The balance of our schools are offering a four year program only. This is an increase of five schools offering the five or six year program over 1957-1958 as we head toward a compulsory five year program in 1960.

The number of new students reported registered in continental colleges of pharmacy in 1958-1959 is 5,841 as compared with 4,655 for 1957-1958. This represents a gain of 25.4 per cent. It must be remembered that this large increase reflects benefits from a rebound of college enrollments which hit the low in 1957-1958 and also a gain through the more normal registration credited in the transition of schools from the four to the five year program.

There are 3,966 students listed as seniors in colleges of pharmacy in the continental United States. This represents an increase of 50 senior students, as compared with 3,916 senior students reported in 1957-1958.

Dean H. G. Hewitt of the University of Connecticut, who is chairman of the AACP Executive Committee, commented as follows:

"These figures are most encouraging and I believe are the results of two factors: One, a normal student population increase and, two, the beginning of results due to the recruitment efforts of many groups, associations, undergraduate schools and individual pharmacists."

Wisconsin conference. Plans have been completed for the first annual National Industrial Pharmaceutical Conference to be held June 14-17, 1959, at Land O' Lakes, Wisconsin, Louis W. Busse, Associate Dean of the University of Wisconsin School of Pharmacy, has announced.

The conference, the first of its kind in this country, will center around processes concerning compressed tablet manufacture and will give industrial pharmacists an opportunity to discuss industrial problems with fellow workers.

Attendance will be limited to seventy-five pharmaceutical educators and members of pharmaceutical industry, according to Richard S. Strommen, Assistant Director of Extension Services in Pharmacy, UW Extension Division, who is in charge of arrangements. Strommen said applications for registration will be mailed early in 1959.

"Nationally prominent speakers from both education and industry will present discussion in their fields of specialty," Busse said. "Discussion will include the physics of tablet compression, granulations and their flow properties, the machines used in these processes, and the physical evaluation of the finished tablets."

Clark writes book. *Orientation in Pharmacy* is the first book of its kind giving a simple understanding of the pharmacy profession to aid new students in getting acquainted with the career they have selected. Written by Dr. Ralph W. Clark, Dean of the College of Pharmacy, University of Oklahoma, the book is a contribution to pharmacy studies based on Clark's thirty-eight years in the profession.

Printed by the OU duplicating service, the book has been distributed to beginning pharmacy students in the seventy-two colleges of pharmacy in the U.S. through the courtesy of McKesson & Robbins, Inc., New York City.

Called an "overview" by the author, the book is intended not only to inform but also to encourage a beginning student to be more interested in continuing his education in the pharmaceutical profession. The book introduces pharmacy as a profession, and tells how to become a pharmacist. It gives the history of pharmacy, both in America and internationally. It explains the opportunities in the profession, pharmaceutical ethics, how to conduct a successful business in that field, and the present and future status of pharmacy. It presents a quick resume on the development of new drugs—how they meet a need, are effective, and the research and production, control, and fate of new drugs.

Mattocks receives grant. Dr. Albert M. Mattocks, University of Michigan, has been granted $2,500 by the Lederle Laboratories for a one year fellowship for "Study of Oxidation of the Tetracyclines."

Michigan receives grant. Parke, Davis and Company has given $2,500 to the University of Michigan College of Pharmacy for the continuation of a fellowship.

Schubert to Austria. Dr. Walter J. Schubert, Fordham University, attended the Fourth International Congress of Biochemistry held in Vienna, Austria, from September 1 to 6. Dr. Schubert was invited to present a paper at the Congress because of his basic research in natural products.

MCP scholarships. Fifty students at Massachusetts College of Pharmacy for the 1958-59 session were granted a total of over $10,000 from thirty-five different scholarship funds.

Summer research at MCP. During the summer thirty faculty members and graduate students were engaged in varied programs of research at Massachusetts College of Pharmacy. These were sponsored in part by Abbott Laboratories, American Foundation for Pharmaceutical Education, John H. Breck Co., Inc., E. L. Patch Company, Lakeside Laboratories, National Institutes of Health, Nordmark Pharmaceutical Laboratories, Smith, Kline & French Laboratories, Sterling-Winthrop, U. S. Vitamin Corporation, and White Laboratories.

Fraternity honors Nolen. Delta Sigma Theta International Fraternity of the Healing Arts presented its annual award for distinguished services to the healing art professions to Dr. Herman C. Nolen, President of McKesson-Robbins, Inc., at the fraternity's forty-fourth international convention at Long Beach, New York, September 27.

New Journal. Of interest to many pharmaceutical educators will be the new journal *Pakistan Journal of Scientific and Industrial Research,* published by the Pakistan Council of Scientific and Industrial Research, Karachi, Pakistan. It is published quarterly at an annual subscription rate of $3.17, including postage. Subscriptions may be addressed directly to the Council at 3/4/D/IV, Nazimabad, Karachi, Pakistan, or obtained through international booksellers.

Hawaiian convention. The Third Annual Mid-Pacific Druggist Convention has been scheduled for May 25-28 at the new Princess Kaiulani Hotel, Honolulu, Hawaii. Special convention rates will be made available at the convention hotel, and

special plans are being made for people visiting Hawaii for the first time. These will include special Hawaiian tours, Hawaiian Luau, a Hoolaulea, authentic Chinese nine-course dinner, a cruise into Pearl Harbor, visit to the National Shrine of the USS Arizona and Utah, sight-seeing trips, cocktail parties, and other tropical entertainment. Further information is available from Mr. Jacob Kim, Chairman, Hawaii Druggist Convention, 1140 Kona Street, Honolulu, Hawaii.

The various branches of the profession will always have different major responsibilities, and it is indeed fortunate that not all of us will ever think alike.
Ernest Little, Am. J. Pharm. Ed., 6, 111 (1942)

BOOK REVIEWS

The Health of a Nation: Harvey Wiley and the Fight for Pure Food, Oscar E. Anderson, Jr. University of Chicago Press, Chicago, 37, Illinois, 1958. ix + 333 pp., 14 illus. $6.00.

Once again the work of Harvey Wiley, persistent proponent of the Food and Drug Act of 1906, has been reviewed, this time by an historian. Oscar E. Anderson, Jr., Associate Professor of History of the University of Cincinnati, has written a fresh account of the struggle for, the passage of, and the trials connected with the enforcement of the first attempt by the federal government at general regulation of the food industry. Wiley left a professorship in chemistry at Purdue University in 1883 to enter the Washington scene as Chief Chemist for the Department of Agriculture. From then on, until he quit the government in 1912, his life was a curious mixture of science and politics, fights and frustrations, victories and vindications. "Federal food and drug legislation, of course, would have been enacted eventually even if Wiley had never left Purdue. But the campaign needed leadership. By profession, position, and temperament, Wiley was able to supply it. His greatest contribution to the cause was not his scientific work, not his ability to dramatize the issue, but rather the inspired generalship he offered. Thoroughly versed in scientific and administrative details, he kept, though not without defections, a strange alliance on the battle line and gave the captains on the congressional front the help they needed. He was the one individual who gave continuity to the struggle for pure food and drugs, the one leader who consistently saw the big picture. Wiley was in large part responsible for the fact that food and drug legislation came when it did and in the form that it did. His leadership in this cause was the finest achievement of a long and useful life."

The book is hardly a biography of Wiley, the man; but an impression of Wiley as a person is inescapable. That impression is none too good. He was a great man; of that fact there is no doubt. To the people of the United States interested in the problem of pure food he was a champion of their cause, a role he delighted to play. But his human shortcomings continually crop up in this account of his public life to mar the frequently overdrawn heroism of his career. The author is no iconoclast; as a matter of fact, he frequently editorializes sections of the book in attempts to save Wiley's face, but his treatment of the material is at times too honest. Wiley emerges as a shrewd, maneuvering, often selfish and vindictive person, unpopular with the men with whom he worked most closely.

Pharmacists may be disappointed in this book because it is concerned chiefly with activities involving food control; drug legislation as a result seems to be given incidental treatment. When it is realized that Wiley, the central figure in the book—and in the fight for the Food and Drug Act—was always more closely identified with the science of foods and nutrition than he was with drugs and pharmaceuticals, the reason becomes clear. This fault does not detract from the usefulness of the book for those in the health professions who want a full account of the difficulties, particularly the political ones, overcome by the persons who pushed the 1906 Act through Congress.

Anderson has converted a vast collection of source material into a smooth but objective report on his topic. His text is well documented, but it is unencumbered by footnotes and the usual scholarly apparatus, all of which have been relegated to the last forty pages of the book. It is well indexed. The book has a justifiable place alongside the several other historical, political, legal, and professional works on the subject.

George E. Osborne
University of Rhode Island

Drugs of Choice 1958-59, Walter Modell, Editor. C. V. Mosby Company, St. Louis, Missouri, 1958. 931 pp. $12.75.

This volume provides a survey and authoritative evaluation of drugs in thirty-five different categories of medical conditions. Each of these categories is handled as a separate chapter by a different author or authors, all of whom are clinicians with specialized experience in the problems they review. A comprehensive list of both official and proprietary drugs follows each chapter. These lists are strictly current and contain dosage forms, methods of administration, and identification of commercial sponsor. A generous list of well-selected literature references also accompanies each chapter. The detached unbiased attitude of healthy skepticism which prevails throughout should be exceptionally helpful to those who have to make a choice between a wide variety of

commercially slanted claims. The chapter topics are broadly comprehensive and include: diuretics, anti-infective agents, anesthetics, tranquilizers, anticonvulsants, entiemetics, muscle relaxants, intestinal parasites, cardiac diseases, hypertension, peripheral vascular disturbances, antitussive agents, antiallergic agents, antiarthritic agents, cancer and allied diseases, urologic disorders, dermatologic drugs, and treatment of common poisonings. The volume can serve as an excellent review of current drug therapy and its basic principles as well as a practical reference source of information furnishing helpful strategies for a wide variety of therapeutic skirmishes.

R. P. Walton,
Medical College of South Carolina

Cosmetics: Science and Technology, Edward Sagarin, Executive Editor. First Edition. Interscience Publishers, Inc., New York, New York, 1957. xix + 1433 pp., 128 figs., 107 tbls. $25.00.

This treatise is ample evidence of the realization by the cosmetic industry a score of years ago that sound growth and progress rested on scientific study and research rather than on empirical formulation of products. The references to articles in reputable scientific and professional literature following each chapter represent an almost complete bibliography of the field, and most of these articles have appeared within the last twenty years. There are sixty-one contributors to fifty-three chapters, and each contributor is an authority in his field. In general, the contributors have Ph.D. or M.D. degrees. Thorough and painstaking editing has eliminated duplication of materials except when necessary for understanding of the subject matter of a particular chapter.

Thus this encyclopedic volume is the most comprehensive, authoritative, and current record in the cosmetic field, a most valuable source of information for students, teachers, manufacturers, and researchers. The contents of the book are divided into five parts followed by a seven-page index of trade-named materials and suppliers thereof, an author index, and a subject index. Part I, entitled "The Scope of Cosmetics," includes three chapters. Chapter One discusses various legal definitions of cosmetics, drugs, and, devices, and points out the possibility of overlap in their application. Chapter Two is an excellent historical treatment of the use and composition of cosmetic materials and products beginning with the early Egyptians. Chapter Three discusses the close relationship between cosmetic and therapeutic benefit. The chapter also gives comparative data on sales volume related to total population growth, individual product and type of retail outlet, data on retail price trends, and figures on annual expenditures per family in various cities. There also is consideration of the organizational structure of the industry up to the point of retail distribution.

Part II on "Toilet Preparations" includes thirty chapters, each devoted to a single product or to groups of related products. A representative chapter includes anatomical and/or physiological considerations, materials, formulations, and methods of manufacture. There are additional chapters on fragrances, aerosol cosmetics, and hypo-allergenic cosmetics.

Part III contains six chapters which treat of manufacture and technology including plant lay out and equipment, quality control, performance and evaluation, emulsification, preservation, and coloring agents. Part IV has four chapters on the Federal Food, Drug, and Cosmetic Act of 1938, the Wheeler-Lea Amendment to the Federal Trade Act, the Canadian Food and Drugs Act, and patents and trade-marks.

As this is the most recent of four books in the field since 1940, it is logical that it should contain the latest information in areas of rapid development. There is an excellent review of literature on dental caries research and anti-caries agents, a comprehensive chapter on aerosol products, discussion of polyvinylpyrrolidone(PVP) in diverse products, and an ample treatment of permanent wave agents with mechanism of action.

Failure to mention pigment and dye combinations for typical shades in face powders, rouges, lipsticks, etc. can trouble a teacher who desires to develop a laboratory course with a minimum of experimentation on the products involved. But this is a minor consideration since it is the reviewer's experience that most formulas found in literature require additional study and revision before they yield acceptable products in laboratory procedures.

Certainly, this book should be in every college of pharmacy library, but the cost can be a deterrent to its use as a required text in undergraduate instruction. Its extensive scope and voluminous treatment of the subject matter exceed the needs of the usual undergraduate cosmetics course.

Charles V. Netz
University of Minnesota

Reactions of Organic Compounds, W. J. Hickinbottom. Third Edition. Longmans, Green and Company, New York, New York, 1957. xi + 608 pp. $8.75.

This book is exactly what the title suggests—an extensive collection of reactions of organic compounds. Each class of compounds is discussed as to synthesis and reactions in great detail, with numer-

ous examples. Per cent yields, physical contestants, and literature references are given for the examples. The literature coverage is very wide, including Russian and Indian journals as well as the more common European and American journals, and the material appears up to date, with many of the examples employing recently discovered reagents and procedures. Following the discussion of the scope of a synthetic method are one or more laboratory procedures, giving directions in sufficient detail so that typical examples of the synthetic method can be carried out. These procedures are numerous in the book, averaging better than one per page. The directions are at a level such that a beginning graduate student should be able to cope with them easily, but are beyond the level of most undergraduates.

In order to keep the book within reasonable physical limits on size the author has had to limit himself to organic reactions and carefully avoid any mention of mechanism or industrial significance or any of the other areas covered in a general organic chemistry textbook. In some ways this is unfortunate in that it limits the usage of the book to persons already grounded in theory and application. It is especially unfortunate from the point of view of mechanism, since mechanism frequently sheds light on the applicability of a synthetic route. One also is a little taken aback by the brief treatment afforded areas of major industrial importance, but of minor fundamental importance in a reaction sense. For example vinyl polymerization gets ten lines, azo dye synthesis gets one page, and beta-phenylethyl amines are not mentioned at all with the exception of the parent compound.

Where, then, is this book likely to find usage? It would appear most useful as a reference book, alongside Wagner and Zook's *Synthetic Organic Chemistry* or the volumes of *Organic Synthesis*. It would be an excellent text for a course in preparative organic chemistry. It could be used, but with some discretion, as a text in an advanced survey course in organic reactions, but the lack of mechanistic explanation and the dearth of tabular data to indicate trends in homologous series would limit its suitability. Advanced students and professional chemists will find this useful in the same way that the reference books named above are useful, but it suffers in comparison with the more complete works, such as Rood's *Chemistry of Carbon Compounds* or Theilheimer's *Synthetic Methods of Organic Chemistry*. The book is nevertheless a bargain for the price. The contents are remarkably free from typographical errors.

Paul I. Abell
University of Rhode Island

Principles of Research in Biology and Medicine, Dwight J. Ingle. J. B. Lippincott, Philadelphia 5, Pennsylvania, 1958. xv + 123 pp. $4.75.

This delightful little book is addressed by the author to "students who are preparing for or are beginning research in macrobiology or medicine." But some familiarity with the principles of research and the logic and practice of scientific inquiry should be an essential part of the education of all individuals who are entering a health science profession. Indeed, one of the outstanding differences between a technician and a professional man resides in the ability of the latter intelligently to weigh the evidence for or against conclusions or opinions that may affect his course of professional action. To have a certain flexibility of outlook throughout his career the professional man must be able and motivated to evaluate the bases of past and future "information." This book by Ingle is written at a level and in a style which makes available some organized insight and information to help develop this ability. Of course, it does not supplant the role of the teacher in this process.

The book considers the methods and basic assumptions in science, the limitations of the observer, the nature of causality, the concept of probability, the principles of the experimental test and the interpretations of the results, and the role of theory. It ends with a keenly observing analysis of the personal and interpersonal attitudes of scientists themselves. The highlighting of assumptions, errors, and variables underlying the discovery of "facts" may be useful even to experienced investigators. The reviewer is not familiar with any other books written with this approach and at this level.

Dr. Ingle has accomplished a remarkable feat in making a book of this kind interesting, very readable, and even entertaining, yet briefly worded. The brevity of treatment results in a number of points being left incompletely treated and occasionally unclear. This should encourage further thought and discussion on the part of the reader, and I think is preferable to a lengthy tome for these purposes. However, in the first chapter, a somewhat more systematic statement of the scientific method (i.e., clarifying the relationships among various aspects of the method, such as the problem to be solved, hypothesis, plan of experimental test, technique of the test, observations, and the drawing of valid conclusions) might provide a firmer introduction for the less sophisticated reader. Such a reader might then have a more coherent framework to which he could relate the subsequent discussions.

This book belongs in the library of

every school of pharmacy. It is recommended strongly, even if only as a reference, for all students in pharmacy, not merely for students preparing to do research. Almost any of the biological-science courses, such as public health, etc., could be designated as the course to adopt the book as a required aid in the teaching of principles of scientific inquiry. If the book is coupled with discussion in small classes, perhaps with example problems designed to illustrate some of the points, education in this important area probably would be much improved in professional and graduate curricula.

Benjamin Libet
University of California

The Strategy of Chemotherapy, S. T. Cowan and E. Rowatt, Editors. First Edition. Cambridge University Press, New York, New York, 1958. viii + 360 pp. $7.00.

A British group, The Society of General Microbiology, is to be commended for another stimulating symposium on fundamental microbiological problems. Research workers were invited to contribute articles, expressing from their varied viewpoints possible new approaches for attacking microorganisms without damaging the infected host. These papers were read at the Eighth Symposium of The Society of General Microbiology held in London last April. The collection of sixteen papers has been edited by S. T. Cowan and E. Rowatt to constitute the volume designated as *The Strategy of Chemotherapy.*

The opening article by Woods and Tucker is an over-all discussion of general biochemical principles pertaining to chemotherapy. They attempt to unify basic observations of many of the participants and to correlate the interaction of the biological and chemical systems as they influence host and parasite.

Woodruff and McDaniel express their belief that the antibiotics will continue as the favorite form of chemotherapy for a period well into the future. Despite the random nature of the origin of antibiotics, these workers are hopeful that the antibiotic specialists will approach antibiotic therapy through the avenues of synergism and biosynthesis. Synergy, or the use of several agents to better accomplish chemotherapeusis than can be achieved with either agent singly, is a recurrent note heard throughout the symposium. In fact, "The Mechanism of Chemotherapeutic Synergy," is the title of one paper by Lacey wherein the subject is treated in great detail.

Parks' contribution to the symposium deals with the selective inhibition of bacterial cell wall synthesis and its possible application to chemotherapy. This is an engaging approach to the chemotherapy of bacterial infections which affords a possible means of employing antimetabolites against several substances that are identified with bacterial cell walls but are not present in mammalian tissues.

In addition the strategy of chemotherapy has been viewed from such angles as the following: Surface active bacteriocides (Newton), membrane penetration (Mitchell), inhibition of energy supplying reactions (Krebs), the activation of metals by chelation (Albert), the designing of antimetabolites (Wooley), lethal synthesis (Markham), and specific inhibition of protein synthesis (Gale).

Papers also are presented with reference to chemotherapeutic problems involving various groups of microbes: Selective inhibition of virus multiplication (Tamm), chemotherapy of bacterial infections (Knox), chemotherapy of fungal diseases (Byrde and Ainsworth), and chemotherapy of protozoal infections (Goodwin and Neal).

Were these articles divorced from the subject of chemotherapy as such, the book would remain a meritorious collection of works on the study of life at the cellular level. It presents a diversity of approaches to such cellular studies as is seldom seen in a single volume.

The title might be misleading to those who dispense and prescribe chemotherapeutics as there is little presented that will assist the physician in his rounds today. The strategy of chemotherapy is largely speculative, and the tactics must follow an intensive and widespread research program.

Owing to the masterly presentation of so many recent and fundamental studies on microbes, this volume should be required reading for all graduate students in microbiology. The research worker in microbiology and those biochemists, geneticists, physiologists, and others who are engaged in studies at the cellular level will be certain to find some if not all areas of the book remarkably stimulating. Needless to say, the specialist in chemotherapy would be poor indeed without this book on his shelf.

H. J. Welshimer
Medical College of Virginia

Standard Methods of Clinical Chemistry, Volume II, David Seligson, Editor-in-Chief. Academic Press Inc., New York 3, New York, 1958. xii + 217 pp. $5.50.

As stated by the editor in the preface of Volume II of this series, "This volume is designed to provide accurate and workable methods upon which the clinical chemist can rely. Although some of these methods may not be used for daily work they should be helpful as references for evaluating those in use. The present volume is directed primarily to clinical chemists. However, we believe that path-

ologists, medical technicians, clinical investigators, chemists in other fields, students, and others will find in this volume useful methods, ideas, facts, and references." Undoubtedly, these objectives have been realized, and the potential usefulness of this book has not been underestimated.

During the past ten years a voluminous literature in the field of clinical chemistry has accumulated. This increased interest in clinical chemistry has been sparked by a growing reliance and dependence of the practicing physician upon clinical chemical data as the basis for the diagnosis of the pathological condition. Consequently, a multiplicity of methods and techniques are generally available for any given estimation. For this reason, the American Association of Clinical Chemists is sponsoring this project in order to make available those methods which are superior in terms of reliability and practicability.

Inasmuch as five years have elapsed since the AACC inaugurated this series with Volume I, the present review will briefly outline the practices employed. The general plan is similar to that followed in *Organic Synthesis, Inorganic Syntheses,* and *Biochemical Syntheses.* Each volume contains a series of monographs covering methods which have been submitted by persons actively engaged in a clinical chemistry laboratory. Each method has been checked by an independent laboratory to confirm its reliability and reproducibility. Should the checker improve the original method, his contributions are incorporated into the monograph.

The organization of the individual monographs throughout the volume is generally uniform. The monograph is introduced by a well-documented survey of the methods and techniques which are described in the literature for the given estimation and delineates the advantages of the method used. The principles upon which the method is founded are then discussed. Directions for the preparation of reagents, glassware, and equipment are given in considerable detail. The procedure is carefully described and then adequately discussed. The method of calculation is noted, and typical results are often supplied. If available, the precision and accuracy of the results are presented. Frequently, a range of values in healthy individuals and in persons with disease is recorded and the clinical interpretation of the values briefly considered.

The current volume contains twenty-one monographs. It is of interest to classify the monographs according to the analytical methods employed in order to gain insight into the relationship between modern analytical techniques and current clinical methods and also to determine the apparatus which is required in the modern laboratory. Twelve of the monographs involved a photometric estimation in which a suitable photoelectric colorimeter or spectrophotometer is required; these estimations included cholesterol in serum, gamma globulin in serum, hemoglobin, free and conjugated 17-hydroxycorticosteroids in plasma, iron in serum, 17-ketosteroids in urine, nonprotein nitrogen, alkaline and acid phosphatase, phosphatides in plasma, protein-bound iodine in serum, sulfobromophthalein in serum, and urobilinogen in urine and feces. Five of the monographs were concerned with titrimetric analysis; these included calcium (complexiметric) (this titration can be followed spectrophotometrically), chloride, total fatty acids in stool, pancreatitis-lipase, and nitrogen by the kjeldahl method. A single fluorimetric analysis was included by means of which porphyrins in urine are assayed. One nephelometric method represented by the cephalin-cholesterol flocculation test is present. In addition, monographs on determination of blood pH and sodium and potassium by flame photometry are included. Thus, it appears that no truly modern instrumental methods are currently employed by the clinical chemist, and his most useful tool is the spectrophotometer.

The monographs in the present volume are all characterized by explicit directions and extensive discussions of the experimental methods. The discussions are invariably lucid. The validity and usefulness of the method and the interpretation of the results appear to be complete in certain of the monographs and superficial in others. References are listed at the end of each monograph, and an author index and a subject index are appended. The typography is excellent, and no typographical errors were found.

This volume is an excellent contribution to the clinical chemist's bookshelf. The editor could very well have cited the pharmacist and the pharmaceutical chemist as persons who would find the book valuable. It is hoped that Volume III will be published before another five years have passed.

Louis Malspeis
Columbia University

Metabolism of the Nervous System, Derek Richter. First Edition. Pergamon Press, New York, New York, 1957. xiv + 599 pp., 165 figs., 155 tbls. $16.00.

The *Metabolism of the Nervous System,* as stated in its preface, "contains the proceedings of the 2nd International Neurochemical Symposium, held at Aarhus, Denmark, in July 1956. It represents a collective effort by a group of investigators working in different fields of research, but having a common interest

in the working of the nervous system in health and disease. In the arrangement of the Symposium a small group of scientists were first invited to prepare reviews on a series of selected topics deemed to be of outstanding importance in relation to this problem. The reviews were then supplemented by a limited number of short papers designed to bring out recent work of special interest, or to add to the diversity of viewpoints by reason of the different academic, methodological, or geographical backgrounds of their authors. The data derived from these different sources were then brought together at the Symposium and submitted to detailed critical discussion."

Some thirteen different fields of interest were covered, as mentioned above, by two to seven papers in each, amounting in all to fifty-five presentations. For many of these a transcript of the actual discussion is given at the end of the paper. Some of the topics covered were: morphology, chemical composition, blood-brain barrier, brain metabolism in vivo and in vitro, carbohydrate, protein, lipid and nucleic acid metabolism, and problems of neurochemical transmission.

The book pictures quite comprehensively the attainment along the research frontier of brain and nerve biochemistry as of 1956. Since that time, of course, progress has furnished some of the answers as well as raised new problems. The reader is introduced to many technicalities of research methods. He is also exposed to a mass of diverse results which, by and large, do not yet fit into a lucid picture of cause and effect nor clearly relate to the functioning intact normal or abnormal brain.

With such a large selection of topics as well as authors one should not be surprised to find all types of reports from the pedestrian accounts of old-fashioned research methods to the dazzling and daring techniques that open up long vistas into the unknown. Certain presentations had a particular appeal to this reviewer. Such were those of Fernàndez-Moràn and of Schmitt revealing the strange new world of the neuron as seen with the electron microscope. Brierley and Bakay ably presented the blood-brain barrier concept in separate papers. The experimental maintenance of brain function in the absence of glucose metabolism as developed by Geiger has afforded a new look into the unknown. The research report of Elliott and Heller on the comparative metabolism of neurons and glia, as well as that of Lowry who has succeeded in weighing and chemically analyzing the "infinite" in smallness, deserves mention. The ever-fascinating problem of neurochemical transmission is nicely presented by a notable constellation of authors for this particular section. Many more of the presentations are worthy of commendation, but space does not permit specific mention.

The book is a valuable reference work specifically for those whose specialty has to do with the functioning of the nervous system. A few of the review articles could be recommended for advanced students in the basic health sciences.

J. Clifford Stickney
West Virginia University

Flavor Research and Food Acceptance, Sponsored by Arthur D. Little, Inc. Reinhold Publishing Corporation, New York, New York, 1958. vi + 391 pp., 83 figs., 46 tbls. $10.00.

The basis for this book is the series of papers presented at four one-day conferences on flavor sponsored by Arthur D. Little, Inc., during 1956-57. Each of the book's thirty-five chapters represents a paper presented by a different author or group of authors. These chapters are grouped into five parts under the following titles: "Physiological and Psychological Aspects," "Laboratory Flavor Testing," "Consumer Product Testing." "Specific Applications of Product Testing in Industry," and "Physiochemical Research."

As this book represents the views of such a large number of qualified individuals over a wide scope of topics, it does, as expressed in the preface," . . . point up the diversity and interrelationship of the areas of flavor research, its progress and potentialities." However, because of this great diversity with the accompanying lack of depth, the reviewer cannot completely agree with the statement, also expressed in the preface, that—"Covering the past, present and future accomplishments and potentialities of flavor research, it should serve for many years as a handbook for those whose professional interests involve flavor."

This collection of papers serves better to introduce the science and technology of flavor to the student in this field rather than to serve active investigators. The usefulness of this work to the latter group would have been enhanced by an increase in depth, even at the expense of restricting scope. Also the inclusion of references to original work following the sixteen papers lacking such references and the extension of references in the remaining papers would greatly increase its value.

There is no summary of questions and discussion nor editorial comment following each paper. Such critical evaluation could have been especially valuable to the novice in this field. It is important when this book is put into the student's hands that he be able to evaluate each chapter. The degree of scientific basis and statistical control varies greatly with the technique discussed. The papers

covering basic physiological, psychological, and physiochemical aspects may have an inherent advantage in this respect over the papers dealing with flavor and product testing. In addition, however, there is a wide variance in the degree of control of the papers presenting flavor-testing techniques. For example, it is the opinion of this reviewer that the chapter on "Sensory Difference Tests" has a much firmer foundation than the chapters on "The Flavor Profile in Review" or the chapter, "Time-Intensity Studies."

Although there is little need for this book as a pharmacy classroom text, it may well be included in libraries serving pharmacy schools. It would be especially helpful to undergraduate and graduate students interested in flavor research and evaluation.

Joseph E. Sinsheimer
University of Rhode Island

The Encyclopedia of Chemistry (Supplement), George L. Clark, Editor-in-Chief; Gessner G. Hawley, Managing Editor; and William A. Hamor, Advisory Editor. Reinhold Publishing Corporation, New York, New York, 1958. vi + 330 pp., 37 figs., 51 tbls., and numerous illus. $10.00.

As indicated by the title of this volume, it was published to complete the coverage of topics which the editors determined should round out *The Encyclopedia of Chemistry* published in 1957. Although the Supplement includes between its covers many interesting and timely articles written by 154 contributing authors, it is important to note that the reader should have at his disposal *both* publications in order to better make use of cross references. The editors point out that there will be no further supplements to the original volume and that "as soon as economically feasible the entire work will be revised and reissued as a single volume."

The topic discussions in the Supplement are of the same order of conciseness and clarity as those in the original publication. The high quality of paper, the error-free readable type, and the alphabetical arrangement of topic headings on 6¾ by 10 inch double-columned pages have all been preserved in this handsomely bound book.

Of particular interest to those in pharmaceutical circles, the Supplement gives condensed and authoritative treatment to such topics as aeration blending, agglutination, amalgams, antidotes, antihistamines, antimalarials, antiparticles, automatic titration, band spectra, barbiturates, Brix scale, chemical etymology, chemical process equipment, chemotherapy, cholesterol, coagulation, collagen, colorimetry, computers, dentifrices, digestion, dosimetry, drugs affecting the mental state, electron diffraction and scattering, fat splitting, flame photometry, flocculation, fluoridation, fluorometry, gas chromatography, lanolin, legal chemistry, liquid state, molecular sieves, molecular weight, narcotics, National Bureau of Standards, National Science Foundation, neutron diffraction, Nobel Prize (chemistry), nuclear magnetic resonance, nuclear reactor materials, nucleoproteins, particle size, peptization, periodic table, phosphorimetry, polyelectrolytes, porphyrins, radiation biochemistry (chemical), raman spectroscopy, resonance, rheology, scattering of ions, sedatives and tranquilizers, solid state, spectrophotometric titration, statistical techniques, sunproofing agents, taste (organoleptic tests), technical writing, trace elements analysis, ultrasonic processing, water, zein, and zeolites. In keeping with effectiveness in the communication of technical information to the reader, the printing of tables, figures, and illustrations in this volume has not been spared.

It is the opinion of the reviewer that this, like its parent publication, well deserves a prominent place in the industrial, educational, and home library.

Charles F. Martin
State College of Washington

Pharmacy Service in Smaller Hospitals, A. Berman and J. J. Zugich, Editors. College of Pharmacy, University of Michigan, Ann Arbor, Michigan, 1958. v + 263 pp., 54 figs., 32 tbls. $3.00 (paper).

The editors of this manual have followed the old teaching-preaching principle: tell them what you're going to tell them, then tell them, then tell them what you've told them. And they have done this succinctly.

This is the first American book on the subject and therefore deserves a large share of this column. The fundamental barrier between the community pharmacist and the local small hospital has been that the pharmacist did not know the needs of the hospital and the administrator did not know what professional services the pharmacist had to offer. A careful study of this manual and a visit to two or three hospital pharmacies should remove the plank from the pharmacist's eye and enable him to approach the hospital administrator with confidence and a worth-while proposal.

The first quarter of the book is written by the editors and is divided into three sections. The first section introduces the community pharmacist to the hospital, describing the place of the hospital in community health care, the relationships among the professional and nonprofessional services of the hospital with special emphasis on the role of the administrator, and the place of the pharmacy service in the hospital team.

The second section discusses the principles of affiliation between the community pharmacy and the hospital, declaring that the pharmacist must accept both professional and managerial functions in the hospital organization. Considerable space is devoted to the responsibilities and functions of the pharmacist and the facilities and policies of the pharmacy service.

Section three consists of procedural guides to help the pharmacist in buying, storing, dispensing and charging for drugs, in keeping proper records, and in the education of the other professional staffs through pharmacy bulletins and the hospital formulary.

In this first quarter of the manual liberal use has been made of articles in the recent literature of hospital pharmacy. The last three-quarters of the manual consists entirely of reprints of selected articles with only an introductory paragraph to each by the editors. These articles have been carefully chosen so as to be particularly useful to small hospitals. Among the subjects covered are the legal aspects of drug service to hospitals, including control of narcotics; an extensive treatment of the necessary records, with many examples; working with the Pharmacy and Therapeutics Committee of the Medical Staff, and the preparation and use of the hospital formulary; coordination of nursing and pharmacy departments; continuing education programs for the hospital staff, including library and reference facilities; consideration of safety factors and labeling; purchasing and inventory controls, and drug charges and pricing systems used in hospitals.

A chapter of particular benefit to the community pharmacist affords a brief introduction into medical terminology and the abbreviations commonly used by hospital staffs. The book concludes with three articles describing actual examples of pharmaceutical service to smaller hospitals by community pharmacists.

The manual is written simply, the type is large, illustrations and tables are numerous and helpful, and the index is adequate except for lack of an author index. The paper-backing of this reference manual will probably be quickly lost once the manual is put to use.

This reference manual will prove useful to pharmacists and administrators of hospitals of all sizes. However, it is written specifically for guidance of pharmacy service in smaller hospitals. Therefore, it should not be reserved for use in teaching courses in hospital pharmacy administration; rather it should be utilized in the courses in dispensing and/or drugstore management.

William M. Heller
University of Arkansas

The Apothecary Chemist Carl Wilhelm Scheele A Pictorial Biography, George Urdang. Second Edition. American Institute of the History of Pharmacy, Madison, Wisconsin, 1958. 66 pp., 36 ilus. $2.50 (paper).

This booklet is a revised edition of one of the earliest publications of the American Institute of the History of Pharmacy. Although the contents are the same, there has been a good deal of editing, and a complete rearrangement of the pictorial materials in this new issue. Since the first edition (1942) was published in a limited quantity, the Institute is to be commended for making the booklet available again, for it belongs in any library interested in the history of pharmacy or the history of chemistry.

The major portion of the booklet is a short, well-balanced biography of Scheele. Dr. Urdang proudly and properly points up that pharmacy "was undoubtedly the basis of Scheele's scientific work," and that Scheele sustained himself and his chemical experiments by his day-to-day work as an apothecary. But Dr. Urdang's treatment is moderate and restrained; he seems, for example, to underplay the now generally accepted priority of Scheele in the discovery of oxygen. The absence of any full-fledged biography of Scheele in English makes Dr. Urdang's contribution all the more valuable.

The booklet is attractively illuminated with portraits and memorabilia pertaining not only to Scheele's life, but also to the history of chemistry. In addition there are separate listings of "Scheele's Achievements" and of a "Timetable of Experiments" (the latter alphabetically arranged). Either of these must leave the reader in awe: in terms of both quality and quantity the productivity of this apothecary genius in his short life (1742-1786) has been properly described elsewhere as "amazing."

In the current furor that seeks to interest the youth of our country in science, this account of Scheele's life and accomplishments can perform a desirable inspirational function. And for our colleges of pharmacy, this reviewer would recommend that the reading of this booklet be made an integral part of any orientation course.

David L. Cowen
Rutgers, The State University of New Jersey

Methods of Testing Chemicals on Insects, Volume I, Harold H. Shepard, Editor. Burgess Publishing Company, Minneapolis, Minnesota, 1958. iv + 356 pp., 43 figs., 6 tbls. $5.00.

The preface of this book states that: "Several years ago the Entomology Subcommittee, Chemical-Biological Coordination Center of the National Research

Council, designated the writer as editor of its proposed manual of entomological testing methods." However, the termination of the Coordination Center "resulted in all rights and responsibilities being relinquished to the editor."

This volume includes fourteen chapters, each prepared by a specialist or specialists, and each dealing with the effects of chemicals on the physiology of insects. Areas covered are surface phenomena in relation to insect cuticle, penetration of insect cuticle, measurement of respiration, electrophysical preparations, study of the insect's circulatory system, radioactive tracer methods, resistance studies, methods of topical application and injection, feeding and drinking methods, dipping methods, precision spraying and dusting, fumigant testing, and synergism and antagonism.

Contents of the chapters are well organized and presented in such a way as to be easily interpreted by the reader. A number of useful figures are included. The section entitled "Literature Cited" is a rather extensive one and covers a total of twenty-eight pages.

The reviewer feels that this book will constitute a valuable addition to the pharmacy reference library as well as to the libraries of colleges of agriculture, certain research laboratories, agricultural experiment stations, etc. The volume will serve as an excellent source of information on the subject of insecticide testing.

The editor states that a second volume will be given over largely to "special-purpose techniques" such as repellents, soil treatment, wood impregnation, acaricides, etc. There is hope also that a third volume will contain subject matter not included previously, as well as a summary of recent methods so as to bring earlier topics up to date. The three volumes, when completed, will be extremely useful. However, a library should not wait for the latter two before acquiring Volume I.

Maynard W. Quimby
Massachusetts College of Pharmacy

Radioisotope Laboratory Techniques, R. A. Faires and B. H. Parks. Pitman Publishing Corp., New York 36, New York, 1958. xi + 244, 89 figs., 38 tbls., 4 plates. $5.75.

In the words of the authors, "This book is intended primarily as a manual for the man in the laboratory, rather than a textbook." They have chosen to treat the subject material in such manner that the newcomer to the field of the application of radioisotopes may find concise information regarding the practical utilization of this research tool, unencumbered by details.

The first four chapters are concerned with brief discussions of nuclear physics, properties of radiations, production of radioisotopes, and health physics. These are followed by chapters on laboratory construction and design, hazard control, decontamination, and laboratory apparatus other than instruments. These chapters, in certain instances, offer the reader information, concisely summarized, which is often difficult to find in similar treatises.

The various methods of detection and measurement, the choice of counting instruments, and counting techniques are adequately covered. The inclusion of tables giving the causes of faulty operation of various counters and listing "symptom" and "possible cause" will be appreciated by those of us who are unskilled in electronics. References to manufacturers of equipment will be of more value to the reader in Great Britain than to the American.

The chapters which consider the applications of radioisotopes are woefully brief and incomplete.

The book offers the reader a nodding acquaintance with the various aspects which must be considered when approaching a laboratory problem in which radioisotopes will be used. It will by no means supply him with the detailed information necessary to carry out the experimentation but may well serve as a guide to further readings.

It is accurate and clearly written and is worthy of inclusion on the shelves of a pharmacy library.

Ara G. Paul
University of Michigan

Experimental Pharmacognosy, Varro E. Tyler, Jr., and Arthur E. Schwarting. Second Edition. Burgess Publishing Company, Minneapolis, Minnesota, 1958. iii + 81 pp. $2.75 (paper).

The second edition of this laboratory manual differs principally from the first edition by the same authors in three particulars: the deletion of one experiment, a substitution, and the addition of two new experiments and a key to the identification of powdered drugs.

The major deletion involves the elimination of the entire experiment on the assay of penicillin. The major substitution occurs in Section IV and involves the preparation from bitter almonds of a beta-glycosidase (emulsin) and testing its activity in place of the detection of oxidase systems (in acacia) of the first edition. A minor substitution occurs in one exercise: the use of celery stem instead of coleus in Exercise 6 to demonstrate collenchyma cells.

The major difference from the first edition, then, consists in the inclusion of several new experiments and procedures. The first of the new items occurs in Section II where a key to the identifica-

tion of powdered drugs has been inserted. This dichotomous key is arranged to identify (a) bark drugs (23), (b) wood drugs (6), (c) leaf drugs (27), (d) flower drugs (10), (e) rhizome and root drugs (32), and (f) seed and fruit drugs (13). This innovation, even with the omission of all powdered drugs of animal origin (coccus, cantharis, mylabris, etc.) and the use of a limited number of plant drugs, should increase the usefulness of this second edition to those schools which devote some time to the microscopic study of powders. In this reviewer's experience in teaching pharmacognosy at the graduate level to students with a major in botany, including plant anatomy and cytology, considerable more background in these botanical sciences than that possessed by sophomore or junior pharmacy students is prerequisite to a more effective use of a key to the identification of all powdered drugs.

A new experiment is the preparation of citrus pectin from the grapefruit rind. This new preparation is added to Section III as Experiment No. 17. In Section IV, as Exercise No. 28, the synthesis of starch is outlined by reacting starch phosphorylase (extracted from potato) on glucose-1-phosphate in solution. Minor additions consist of the use of the polarizing microscope in the examination of starch grains and calcium oxolate crystals in Experiment No. 7 of Section II, and an alternate procedure for the preparation of citric acid by the fermentation process utilizing a surface culture technique.

By way of summary of the changes or revisions occurring in the second edition, as just described, these further observations will be useful. Of the total number of thirty-five exercises (compared with thirty-seven exercises in the first edition), two exercises are new as indicated, one involves a major substitution as indicated, and one (No. 14 dealing with microchemical tests) combines exercises 9, 10, 11, and 12 of the first edition. The following exercises, then, are identical with exercises in the first edition: Nos. 1 through 5, 8 through 16, 18 through 26, 29, and 31 through 35. The statement "numerous experiments have been revised" occurring in the preface does not seem, therefore, to be fully justified.

The number of exercises and the emphasis pertaining to the isolation of natural products (11), which is very commendable as recognizing the modern trend in pharmacognosy, stand in sharp contrast to the almost equal number of exercises (10) devoted to microscopic examination of drugs (histology of organs and powdered drugs), admittedly the traditional content of laboratory work in pharmacognosy. The contrast lies in that while the manual launches out into the new look in pharmacognosy, it yet maintains a firm grip on the old. It is quite obvious that studies of cell constituents and plant histology are in the realm of pure botany and should preferably be pursued in an introductory course to pharmacognosy where this study is more feasible. Similarly, many of the exercises in the isolation of natural products could be best performed in the course on drug plant extraction. At any rate, it seems desirable to give some attention to the various tests for identity and purity (official and unofficial) of various official drugs representative of the groups saccharides and polysaccharides (gums, mucilages, phycocolloids), fats, fixed oils and waxes, resins and balsams, tars and tannins, etc.

As in the first edition, so in this edition, blank pages of a heavy white paper for submitting reports on each exercise have been inserted after each section of exercises. These total thirty-five and add considerably to the thickness—and no doubt to the cost—of the volume.

The printing is very well done and is singularly free of typographical errors, insofar as this reviewer could detect. The binding is with heavy spiral wire, and the cover is of heavy gray paper. Those colleges which have adopted the first edition will surely welcome this second edition, and those which do not use it will want to consider it carefully.

Carl C. Albers
University of Texas

Physical Processes in the Chemical Industry, Volume II. Dispersion of Materials, Rolt Hammond. Philosophical Library, New York 16, New York, 1958. ix + 230 pp., 79 figs. $10.00.

This book has been written for the chemical process industry where raw materials must frequently be prepared in granular or similar form and where dispersion plays an important role as a physical process. The subject of dispersion is considered from the standpoint of the properties of matter effecting dispersion, dispersion equipment, and operations. The dispersion of particles, mixing, and other methods of achieving uniformity of distribution of materials are either not considered or are dealt with only very briefly. The author admits to some overlapping between subjects covered in this volume and in his first volume, *Separation and Purification of Materials.*

The book contains six chapters, three of which are probably outside the field of interest of most manufacturing or industrial pharmacists. In the chapter dealing with crushing and grinding, the effect of the properties of materials on the process of crushing and crushing equipment is considered, and the methods and scales of quantifying these properties are described. Equipment used for pri-

mary crushing (breakers, sledges, types of crushers and disintegrators) are illustrated and described as to design features, capabilities, applications, and output. The problems encountered in and equipment used for the crushing of coal, stone, and various ores are discussed. Ball, tube, rod, and tumbling mills are considered under the heading of grinding. Design features, construction materials used, advantages and areas of application, and the more important operating variables for these mills are presented.

Under the subject of classifying materials the topics of classifying equipment, particle size analysis, sieving, and crystallization are each considered from the standpoint of basic theory, operating principles, and apparatus.

One of the more interesting chapters deals with liquid dispersions. The theory, definitions, examples, properties, stability, and the factors affecting stability of solutions, colloidal solutions, suspensoids, emulsoids, emulsions, and suspensions are discussed. The types of liquid dispersions are described in clear and simple terms. The following physical processes connected with liquid dispersions are also considered: liquid extraction including both simple and continuous methods, homogenization, ultrasonic vibrations, mixer-settler operations, and separation of multi-component mixtures by mechanical contractors. The subject of homogenization is considered in some detail. Homogenizing equipment, applications, and procedures are thoroughly described with the homogenization of milk serving as the example for this section. Methods of producing emulsions other than by homogenization or ultrasonic vibrations are not considered.

Other chapters and sections of the book consider fluidization, flotation, dispersion of gases, and atmospheric pollution.

While the reviewer appreciates the fact that the subject of materials dispersion would not be simply to organize logically, criticism must nevertheless be made of a degree of disorganization found in parts of the book. In several instances the same topic is discussed in part in two or more chapters. The fact that the author is British and that the greater part of the equipment which is described is consequently British also detracts somewhat from the value of the book. However, the book is written in such a manner that it may easily be read and understood by the nonengineer. All factors considered, this book warrants consideration by libraries of schools having graduate industrial pharmacy courses.

Gilbert S. Banker
Purdue University

Advanced Analytical Chemistry, Louis Meites and Henry C. Thomas. McGraw-Hill Book Company, New York 36, New York, 1958. viii + 540 pp., figs., tabls. $8.90.

This book is devoted primarily to the study of the theoretical foundations of instrumental methods of analysis, the general types of information that can be secured by their use, and their comparative advantages and limitations. The authors define analytical chemistry as "that branch of chemical research which has the development and improvement of practical analytical procedures as its goal." Throughout the text the research aspects of the analytical chemist's activities are emphasized.

Taking cognizance of the limited time usually allotted to courses of this type, the authors have chosen to discuss a relatively small number of instrumental methods. These are the ones of greatest utility and those most essential to the understanding of techniques that have been omitted. Thus, there are a relatively small number of topics, but each is treated thoroughly. After a short introduction, there is a brief chapter on ionic equilibria in solutions, devoted to a consideration of solubility measurements, and a discussion of the factors entering into an accurate determination.

Chapter 3 deals with potentiometric measurements, and gives an excellent discussion of all aspects of this subject important in chemical analysis. The importance of pH measurements is recognized by devoting an entire chapter to this topic. Included here are a variety of titrations involving hydrogen or hydroxide ions.

The next subject treated is that of conductometric measurements, starting with a brief review of the fundamentals, and then a discussion of the applications to the measurement of various physicochemical properties of solutions and to chemical analysis.

Polarography and amperometric titrations are the subjects of Chapter 6; both are adequately and clearly discussed. Electrolytic methods, including coulometry, are covered in the next chapter. Methods based upon absorption of radiation are divided into two chapters, one on visible and ultraviolet absorption, the second on infrared. The latter is contributed by Robert P. Bauman. Both chapters are well written and present the subject in a logical, orderly manner which should be easily understood.

Chapter 10 is devoted to radiochemical methods, in which the elements of radiochemistry are discussed, and a number of applications are described. Ion-exchange and chromatographic methods are described in Chapter 11, with by far the

greater emphasis on ion-exchange materials, methods, and theory. Partition chromatography is touched upon briefly. The final (numbered) chapter is a very valuable discussion of the development of an analytical method which should be very helpful to the graduate student in this field.

There are numerous problems at the end of most of the chapters; answers to many are included. A selected bibliography for further study is presented for each topic. The Appendix contains several tables of useful data. There is a section of 116 pages of experiments to demonstrate the practical applications of instrumental techniques. A wide degree of latitude is afforded the instructor in his choice of experiments to suit his needs and desires.

This reviewer was very favorably impressed by the book, and believes it would be quite suitable as a text in a course in instrumental methods of analysis on an advanced undergraduate or on the graduate level.

Louis A. Reber
Philadelphia College of Pharmacy and Science

Separation and Purification of Materials, Holt Hammond, Editor, J. C. Robb, and W. F. Coton. Philosophical Library, Inc., New York 16, New York, 1958, x + 327 pp., 58 figs., 9 tbls. $10.00

This book is the first of a series on "Physical Processes in the Chemical Industry." The author has conveniently presented his book under seven distinct headings, each of which is a separate and distinct phase of the field. His presentation of equipment with the advantages and uses of the same is excellent.

The separation of solids is presented by giving a discussion of the various methods of separation which are currently in use, giving the principle upon which the given equipment operates. The discussion is based upon the screening problems of the mining industry. There is a good presentation on zone melting.

The general methods of separating solids from liquids involving filtration. The different types of filters, filter aids, media, and equipment are thoroughly discussed. The author mentions special filtration problems with methods for handling the same. Mention is also made of handling all forms of liquid solid combinations including sedimentation and evaporation.

Solids are separated from gases by electro precipitation. This is very well presented and is a good summary. The author further presents the difficulties involved in the removal of dust and sulfur from the air by means of filtration. The problem of using accurate instrumentation is a prerequisite to a dust-free atmosphere and the problem of air pollution.

Distillation of petroleum as a mixture is used as the basic example of this phase of his separation studies. The topic is discussed upon the basis of (a) where two mixtures are quite insoluble, (b) where they can be mixed within limits, and (c) where they are immiscible in all proportions. Examples of the most recent distillation techniques such as The Kuhn System, Scott high vacuum distillation, and evaporation of nuclear engineering are reported. Distillation as it applies to fresh water recovery from sea water is ably presented.

Centrifugal separation and purification in nuclear engineering are discussed at length. The methods of producing Uranium 235 are discussed along with special separation methods as used in the development of atomic energy in Great Britain. There is also presented the problem of destruction of waste products from nuclear development. The topic of obtaining uranium from the ore is presented under the headings of crushing, grinding, leaching, dewatering, ion exchange, and effluent disposal.

The author makes a good presentation of some of the basic processes of engineering. The discussion on separation and purifications in nuclear engineering is the best for continuity of presentation.

The book is recommended for a chemical engineer's library as a reference book, and the reviewer can see little application to the field of pharmaceutical engineering which is not already known to the field.

H. George DeKay
Purdue University

Disinfectants: Their Values and Uses, W. E. Finch. The Macmillan Company, New York, New York, 1958. 188 pp. $5.50.

The author, a prominent worker in the disinfectant industry in Great Britain, presents this first edition, attempting "to give a balanced survey of all types of disinfectants and to indicate the uses and limitations of the various groups." A foreword by Professor Berry, formerly of the University of London, referring to the subject of disinfectants and disinfection, indicates that "the number of published textbooks is singularly few."

It is the opinion of the reviewer that this volume conforms to its title only in a limited sense. The author's practical experience appears to be as a worker in the manufacture and efficiency evaluation of coal tar and phenolic disinfectants, quaternaries, and chlorine-containing compounds. Data concerning the first item cover more than one-third of the book Other compounds are mentioned only briefly.

Details concerning the specific uses of these disinfectants other than those in the above three classes are not given, and

the more recently introduced compounds are not even mentioned. For instance, under "Iodine" (154), the kind of solutions of iodine used and how they are employed in practice and the sanitizing efficiency of iodophors are not mentioned. Isoprophyl alcohol, silver and other metallic-containing compounds, essential oils, benzoates, hydroxybenzoates, and many others are not included, although the title concerns "Disinfectants."

Even in the chapters on phenolics, quaternaries and chlorine-containing compounds, there are many preparations available in our country, which are not mentioned.

In the chapter on "A Brief History of the Practice of Disinfection," the following serves as an example of data which are lacking:

Kuchenmeister (1860) recommended the use of "carbolic acid" in place of chlorine as a disinfectant, and Lemair (1860) employed it in wounds even antedating its use by Lister (1867). Davies used iodine in wounds in 1839, and Davaine reported on its bacterial efficiency against anthrax bacillus in 1873. Nothing is mentioned in this brief history, but in the chapter on "Hypochlorites," its use by Semmelweis is reported. It is a fact, however, that Collins employed chlorine-containing compounds in 1829 to stop an epidemic of puerperal fever, and they were used for such purpose by Eisenmann in 1837, ten years before Semmelweis reported on its value, after extensive experience with a large number of patients.

The testing procedures for evaluating antibacterial efficiency considered are those used abroad. The Rideal-Walker and the Chick-Martin tests are employed in England and some countries of the Commonwealth for control purposes and for evaluating disinfectants of similar compositions. The latter test is used by some of the regulatory agencies in Great Britain as a standard procedure for the approval of the marketing of disinfectants. In our country, these methods are rarely used for testing purposes. The F.D.A. Phenol Coefficient Test, the procedure more frequently employed in the United States, has never been approved by the F.D.A. or other federal regulatory bodies in our country as an *official standard* method. This test has been slightly modified, and *today* in our country it is the test method recognized and recommended by the Association of Official Agricultural Chemists and designated as the "A.O.A.C. Phenol Coefficient Method - official." Though the author mentions this in the chapter under "History," the term F.D.A. is used throughout the volume. Furthermore, methods for testing for sporicidal, fungicidal, bacteriostatic and fungistatic efficiencies, testing for sanitizing efficiency, etc. are not included.

In a chapter on "Glossary of Words and Phrases," we do not find such words as germicide (and others with the suffix "cide" or "static"), degermation, sanitize, and antiseptic. The last is found in different parts of the book. It must be recognized that this term, antiseptic, has a "legal" meaning in our country.

Mention is made of preparations marketed in Great Britain such as Cirrasol O D, Miltherex, Milton Antiseptic, P.R.Q. Antiseptic, and others, trade names not known in our country.

Hexamethylenetetramine is mentioned as an "internal disinfectant to sterilize the urinary tract," but other important urinary and systemic antibacterials are not included. Mere mention is made of "exposure to ultra violet light" without indicating that the rays are 2537 angstrom unit wave lengths. Not a word is included concerning ionizing radiations.

Mention is made on p. 114 of "a virtually sterile blanket." The term "sterile" is absolute. It can't be almost or *virtually* sterile. It is sterile or it is not sterile. In like manner, the term sterilization is employed in several places where sanitization is the proper term to use.

References of more recently introduced studies are lacking. Even mention of the American book by Reddish and associates and the British volume by Sykes on this subject is not found in this volume.

The reviewer offers the above as constructive criticism. In its present form this book will perhaps bring to the attention of most readers in our country more questions than it answers. It hardly would find a place in most American pharmaceutical libraries. In its present form, it can serve as supplementary reading for research workers and manufacturers of disinfectants.

Louis Gershenfeld
Philadelphia College of Pharmacy and Science

Industrial Hygiene and Toxicology, Volume I. General Principles, Frank A. Patty, Editor. Second Revised Edition. Interscience Publishers, Inc., New York, New York, 1958. xxviii + 830 pp., 210 figs., 96 tbls. $17.50.

This is Volume I of a three-volume series on the subject of industrial hygiene and toxicology. As the title states, the subjects are treated in general principles only in Volume I. Volume II of the series treats of toxicology, giving specific details of analytical procedures, and Volume III is concerned with industrial environmental analysis. A total of nineteen experienced authors have contributed material for Volume I.

The material is arranged in twenty-one chapters, each of which deals in general

terms with some particular phases of industrial hygiene. For example, separate chapters are devoted to such subjects as industrial hygiene records and reports, survey and personnel, human engineering and industrial safety, industrial sanitation, mode of entry and reaction to toxic materials, sampling and analysis of atmospheric contaminants, air conditioning, air cleaning, ventilation, respirators and respiratory protective devices, pulmonary dust disease, air pollution, occupational dermatoses, visible marks of occupational diseases, fire and explosion hazards of combustible gases and combustible dusts, physiological effects of abnormal atmospheric pressure, industrial noise and conservation of hearing, radiant energy, lighting and screening, and heat control in the hot industries. Developmental and historical aspects of present-day knowledge and practices are well covered in introductory sections.

It is the feeling of this reviewer, although he is not an authority in industrial hygiene and toxicology, that this is an exceptionally well-written reference volume. But Volumes II and III would no doubt be required to supplement Volume I for a complete reference set on industrial hygiene and toxicology. Some of the chapters of Volume I contain appended bibliographies which may be consulted for more detailed discussions.

The expert will no doubt find this to be an exceptionally useful volume which covers an extensive compilation of topics related to his work. Although it is not a legal reference, as the editor states in his preface, it contains much information which should be of use in preventive medicine; therefore, it should be a useful reference volume for the industrial physician who has the responsibility of rendering expert opinions relating to compensations for occupational diseases or injuries, or for the refutation of false claims for compensation.

A medical library, or, for that matter any library of source materials on the subjects of industrial hygiene and sanitation, or toxicology, would need this volume, or rather all three volumes of this series. The college student, for courses in hygiene, industrial engineering, or sanitation, would find Volume I a particularly enlightening source of information pertinent to these subjects. It would be quite appropriate for the science libraries in universities and colleges. The worker in a toxicology laboratory would also find Volume I a handy reference covering a very broad array of subjects on industrial toxicology, but would need Volume II of the series for detailed discussions of procedures in toxicological analyses. This reviewer does not consider Volume I essential for the average college of pharmacy library; exceptional pharmacy colleges, however, with advanced courses in toxicology, would do well to provide Volume I and at least Volume II for toxicology.

Elbert Voss
University of Florida

Increasing Pharmacy Profits, Frank T. James. J. B. Lippincott Company, Philadelphia, Pennsylvania, 1958. xi + 148 pp., 24 tbls. $4.75.

This book is divided into seven parts; an introduction and six others designed to investigate some of the more important aspects of retail pharmacy operations. Part six, "Sales Training for Drugstore Personnel," is intended also as a training manual for an actual course to be offered to the personnel of a store.

The topics covered, in addition to the introduction, are analysis of the retail drugstore, independent drugstore accounting, independent retail drugstore merchandising, sales promotion in the independent drugstore, sales training for drugstore personnel, and dividends from buying and premium programs. If one section of the book can be said to be stronger and more worth-while than the rest, it is the section on sales promotion in the independent store.

The author, throughout the book, has held to a theme of increased professionalism by emphasizing that the competitive advantage held by the independent retail pharmacist consists of the public health or professional aspect of pharmacy and of customer service and customer loyalty. He further emphasizes that these advantages should not be sacrificed in order to utilize mass merchandising and "self-service" techniques of the supermarket. There is also a reasonably good discussion of the drawbacks to the use of trading stamps.

The primary documented research studies used in this book are two in number. Both are authoritative in nature within their limitations, but neither is particularly recent. In some cases, subsequent projects have indicated somewhat different findings, but the author makes no note of these.

The principal deficiency of this book is the fact that most of the topics are treated in a very elementary and superficial manner. Some of the problems of the retail pharmacist are pointed out, but there are few concrete suggestions for overcoming these problems or means of implementing the suggestions where they are given. In addition there are sufficient apparently fallacious conclusions drawn from the facts presented and erroneous references such as to the "Federal Fair Trade Commission" to cast some doubt as to the value of the rest of the suggestions.

It is not completely clear whether the author has directed his book toward retail pharmacy owners or pharmacy students. Much of the material covered would be completely apparent to anyone with any retail experience, and the elementary nature of the book would seem to preclude its usefulness to retailers or students. The retailer would need much more detailed information in order to improve his operation, and the student would need the greater detail to get an adequate grasp of the subject.

The usefulness of the book from either standpoint would have been increased immeasurably by the conclusion of a much more complete bibliography, either by footnote or by separate listing.

There may, however, be enough general interest information to warrant the inclusion of this book in a pharmacist's library.

Richard J. Hampton
State College of Washington

Analytical Microscopy, Its Aims and Methods in Relation to Foods, Water, Spices and Drugs, T. E. Wallis. Second Edition. Little, Brown & Co., Boston, Massachusetts, 1957. vii + 215 pp., 88 figs. $5.50.

In view of the paucity of texts in this field the appearance of the second edition of *Analytical Microscopy* is indeed welcome since the first is long out of print and not to be found in every library. Unfortunately this edition, while appearing some thirty years after the first is, in many respects quite similar and rather limited regarding additions. Nevertheless, the book is a useful source of information even though somewhat disjointed in arrangement.

The book is primarily an outgrowth of problems that have confronted the author in his long years of serving as an analyst. Certainly when one considers the numerous analyses that are unsolvable by ordinary chemical methods, the use of the microscope by the trained microscopist becomes self evident. With this in mind, the perspective of the text can more easily be understood. For the research worker or the industrial microscopist the work is a welcome addition to his library. For the student or the nonprofessional the book offers little in the way of information that cannot be gathered elsewhere in more adequately explained textbooks. The text, unfortunately, repeats in many parts another by the author, *Practical Pharmacognosy*, published in 1953, which is a companion volume to his *Textbook of Pharmacognosy*.

The introductory chapter on the microscope could well have been omitted altogether, for the value of this book is obviously meant for the research worker or the advanced microscopist. Among other questionable points is the statement that *Mentha spicata* (spearmint) has green stems which distinguish it from other varieties of mint. The reviewer has noted many authenticated samples of spearmint with red or purplish stems. Under the chapter dealing with starch might well have been included a description of pretreatment with chloral hydrate solution for those starch granules of extremely minute size, such as found in black pepper, for greater ease in identification. Noticeably lacking is a description of and methods to identify and classify rodent and animal hair and their excreta. These contaminants are too often found in foods and drugs, and their presence is obviously an important consideration for the industrial microscopist. Also it would have been valuable to include methods of fly egg and larvae detection as well as mold.

The book includes chapters on treatment of herbs and some foods preliminary to microscopical examination. It also covers solvent use, staining methods, and the process of kneading in connection with the analysis of flour and starchy products. Some chemomicroscopy and micromorphology of various substances are included as well as techniques of sublimation and chemomicroscopal precipitation. Microscopical measurements of selected botanicals are included as well as numerical values in tabular form. Some quantitative microscopy is included of which the author's Lycopodium Method is a classic in the field. The bibliography is noticeably lacking in American authorities viz. Youngken's well-known *Textbook of Pharmacognosy* and *Pharmacognosy* by Gathercoal and Wirth, revised by Claus in 1956.

The book is profusely illustrated, the line drawings are clear cut and of unquestionable excellence. These in themselves make the text a worth-while addition to the library of the professional microscopist.

Harold I. Silverman
Brooklyn College of Pharmacy
Long Island University

Poisoning, A Guide to Clinical Diagnosis and Treatment, W. F. von Oettingen. Second Edition. W. B. Saunders Company, Philadelphia, Pennsylvania, 1958. 627 pp. $12.50.

The second edition follows closely in style and organization the earlier version of six years ago. It is essentially a text which falls in between the quick reference handbook and the encyclopedia manual. The book contains much useful information, but its value is diminished because both the omissions and inclusions are subject to criticism. A greater emphasis on more important chemicals and therapeutic agents of current interest would

have greatly enhanced the value of the book.

Some newer pharmacologic and toxicologic agents have been included, but, unfortunately, many of the toxic properties of these agents described in the last section (Part IV) have not been incorported in Part II, where the toxic agents are discussed with reference to their effect on organ and organ functions. For example, the phenothiazine tranquilizers are not mentioned under agents likely to produce Parkinson-like tremors; isonicotinic acid hydrazide and its isopropyl derivative are omitted from central nervous system agents associated with restlessness and excitement; and iproniazid and chlorpromazine are not included with liver poisons. On the other hand, many obscure, little-used compounds are lisited as capable of producing these effects.

In addition to this lack of balance, lack of authoritativeness is sometimes evident. The inexcusable omission of nalorphine as an antidote for morphine and other narcotic analgetics is made even more a sin by mentioning nalorphine, where its usage has not been established, under treatment of diphenylhydantoin overdosage. No mention is made of the use of edrophonium for curare poisoning. The fact that prolonged usage of aspirin in high doses may lead to hypoprothrombinemia hardly justifies the statement that medication with aspirin after tonsillectomy or tooth extraction may lead to hemorrhages.

While the book is not without value for the pharmacist and physician, it hardly measures up to *Clinical Toxicology of Commercial Products* by Gleason, Gosselin, and Hodge, which far exceeds the present text in scope, depth, and perspective as well as usefulness, and costs but a little more.

E. Leong Way
University of California

Signs, Symptoms and Treatment of Certain Acute Intoxications, Wm. B. Deichmann and Horace W. Gerarde. Second Edition. Charles C. Thomas, Springfield, Illinois, 1958. xv + 154 pp, 8 figs, 1 tbl. $3.75.

The second edition of this useful, small volume has been brought up to date and somewhat enlarged. It is divided into two parts, the first of which is a brief section on first aid as it applies to emergencies mainly dealing with those to be found in poisonings. This includes artificial respiration, tracheotomy, general treatment of poisoning, and a brief classification of antidotes for general use with a few short paragraphs on supportive treatment. This latter section includes a description of a thoracotomy for the purpose of cardiac massage. A careful perusal of this section leaves one in doubt as to its usefulness to laymen and to what extent a layman could be expected to follow the directions given. If this material is intended only for the physician, the inclusion of such description is probably not necessary.

The second part of the text is an excellent list of common poisons and their synonyms within its design limits. The information given is adequate to satisfy the purpose of the book, and the list is numbered and cross referenced with occasional references given to outside reading where it is anticipated that this may be desirable. Poisoning from overdoses of radiation has not been neglected. A discussion is given on the effects of varying dose levels of radiation with the treatment and prognosis for these. There are one or two inclusions here that seem to be unnecessary and outside the scope of the subject matter. These include the injection of air intravenously and chronic poisoning with milk. The list of poisons is in alphabetical order which eliminates the need for use of an index. However, a short index for part one of the book is included. The language of the book is clear and well written, and in only a few places is there use of unnecessarily obscure or technical terms such as "autochthonous."

This book compares very favorably with other recent publications of similar purpose and size. This book will be highly useful as a text and reference in courses dealing with toxicological emergencies. This valuable little book will easily earn a well-deserved place in the pharmacy library.

R. S. McCutcheon
Oregon State College

Clinical Application of Antibiotics, Volume III. Chloramphenicol and the Tetracyclines, M. E. Florey. Oxford University Press, New York, New York, 1957. ix + 393 pp., 23 figs., 23 tbls. $19.50.

We are extremely fortunate to have had Dr. M. E. Florey, an international authority on chemotherapy, prepare this volume. Pharmacists, dentists, general practitioners, research workers, and students interested in the clinical uses of antibiotics have particular reason to be grateful for the present volume of this valuable series on the clinical application of antibiotics. Undoubtedly, the confusion associated with the principles and practices of antibiotic therapy stems from lack of readily available unbiased, clinical information on the antibiotics. Attention throughout this book is centered upon evaluating critically the available data up to June, 1956, on the antibiotics in clinical medicine and allied fields. The emphasis, as indicated in its title, is clinical.

The present volume, which is set up in excellent physical form, is not encyclopedic in scope. There are subheadings included which the reader will find valuable tools, if for no other reason than they organize his thoughts. The size of the book has been made possible by the inclusion only of such microbiological, pharmacological, biochemical, and clinical details as are pertinent to clinical medicine. In this book the author points out that success with the antibiotics is dependent upon early and accurate diagnosis, followed by their proper use. In Chapters 1 to 3, Dr. Florey introduces chloramphenicol to include its origin and properties; antibacterial action; complication of therapy; results of clinical trial; administration; treatment of diseases due to specific organisms; and treatment of diseases considered by anatomical and physiological systems, age group or sex. As a rule, in Chapters 4-13, the author treats the tetracyclines (chlortetracycline, oxytetracycline, and tetracycline) in much the same manner as chloramphenicol with the exception of Chapter 7, which deals with the growth-stimulating properties of these broad-spectrum antibiotics. Wherever possible, the author points out pharmacological differences in these antibiotics, coordinates their similarities, and indicates the shortcomings of these antibiotics in a particular clinical problem. Reinterpretation of the mode of action and clinical uses of chloramphenicol and the tetracyclines in the light of recent advances in the biological and clinical sciences is an important function of this volume. Certainly, the material is systematically arranged in clear, concise form, and the author has done an excellent job in presenting in textbook form such a detailed and comprehensive study of the clinical application of certain broad-spectrum antibiotics.

A glossary of bacteriological nomenclature, a bibliography, and subject index at the end of the book offer assistance to the reader and make the book itself more interesting and lively, while still giving the reader detailed information of general consideration concerning the antibiotics and their application in specific diseases. It is obvious that not all the articles on chloramphenicol and tetracyclines have been included or reviewed. However, an attempt has been made to give a sufficiently complete bibliography so that a particular phase of a subject can be documented.

This publication is a valuable addition to any library and is an invaluable reference book for scientists and also teachers, research workers, and all who deal with antibiotics. This is one of the best books on the clinical aspects of antibiotics. It differs from many other standard texts in that it will not be out of date immediately after it is published. Dr. Florey has done an outstanding job.

Edward J. Eugere
Texas Southern University

Modern Manufacturing Formulary, Emil J. Belanger. Chemical Publishing Co., Inc., New York, New York, 1958. 399 pp. $10.00.

This type of publication is intended mainly for reference purposes and not as a textbook. It contains numerous formulae and recipes for professional and amateur chemists, manufacturers, businessmen, and those interested in the commercial preparation of food, drug, chemical, and specialty products. Many of the formulae and recipes are good and no doubt would serve as excellent starting points for those people interested in making similar products for expanding their business.

Following a page of abbreviations and two pages of introduction, the author gives formulae and recipes, with directions for manufacture, under the following chapters: 1. Selected Food Products; 2. Flavoring Extracts; 3. Practical Household Formulas; 4. Cosmetic Specialties and Toilet Preparations; 5. Medicinal Preparations; 6. Veterinary Remedies; 7. Carbonated Beverages, Ginger Ales, Beverage Extracts, Fruit Oils, Etc.; 8. Miscellaneous Formulas. Following the formulae and recipes is an appendix which includes rules for figuring doses and information on consumer protection and labeling of drugs under the provision of the Federal Food, Drug, and Cosmetic Act. A classified directory of sources of supply in large lots which cannot conveniently be obtained locally is also included in the publication.

The reviewer feels that the book has very limited application and would not be of value for student use. The various chapters discussed would have more meaning, usefulness, and educational value if the author had included some theory and fundamentals of the subject matter in each chapter. It would also have been of advantage if the author had made some pertinent comments on some of the formulae with regard to stability of the product, packaging, and the advantages and disadvantages of substitute material in the formula, appearance, etc. No bibliography is given.

Charles H. Becker
University of Florida

Psychiatric Research Reports, #9; Research in Psychiatry with Special Reference to Drug Therapy, Edited by Nathan S. Kline et al. American Psychiatric Association, Washington 9, D.C. vii + 181 pp. $2.00.

This report consists of the papers presented at the Regional Research Conference held under the joint auspices of the

American Psychiatric Association and the Medical Schools and Affiliated Hospitals of Philadelphia. Each report is followed by a discussion.

The first forty-six pages cover the pharmacology of prochlorperazine as well as its use in psychiatric disorders. The latter includes the results of clinical studies and how the evaluations were made. The next section (twenty pages) is a discussion and critique on methodology of research in psychiatry, including a short section on physiological studies of psychiatric patients and a section on pharmacological approaches to the study of tranquilizing agents. Since the report is that of a symposium, these sections of particular interest to those in the biological field are much too short, but they do offer some concise "food for thought." The academic address entitled "Some Problems in Experimental Psychiatry," by Dr. Wikler, deserves special mention. In this section he discusses the many-faceted problems in the field, citing 150 references. These references alone make the report worth-while. The remaining sixty-nine pages consist of reports of research and theoretical notes in which is included the metabolism of reserpine in schizophrenic patients and the effects of tranquilizing agents on the pituitary-adrenal system.

In this era of tranquilizing agents where formidable amounts of printed matter are available on the subject, a publication such as this serves a useful purpose in bringing to the scientific world some of the more important work in the area.

This publication is a must for those probing into the mysteries of the tranquilizing agents and is recommended for any pharmacy library. The nature of the publication and its specificity makes it useful only as a reference work.

Tom S. Miya
Purdue University

Cholesterol. Chemistry, Biochemistry and Pathology, Robert P. Cook, Editor. Academic Press, Inc., New York 3, New York, 1958. xii + 542 pp., 54 figs., 69 tbls. $15.00.

This book, which is almost encyclopedic in scope, contains fifteen chapters and an appendix of practical methods as well as an alphabetical list of reference authors and a well-arranged subject index. Its publication now is especially timely since so much emphasis is currently being focused on the study of cholesterol and related steroids. Each chapter has been prepared by an outstanding authority in his field. The general plan for each has been to cover representative work and to include all pertinent references, particularly those of a review nature from which the reader may obtain more comprehensive information on any specific aspect of the subject.

The first few chapters provide historical background, basic physical and chemical properties and distribution in organisms and tissues, as well as methods for isolation of the sterols. To illustrate, the chapter on chemistry includes forty-five pages of illustrated chemical reactions and twelve pages of references as well as pertinent data on physical constants of cholesterol and its derivatives plus a good discussion of nomenclature, color reactions, and digitonide formation.

Chapters 5 to 11 inclusive will be of special value to those interested in the pharmaceutical and clinical aspects of the steroids. These deal with the physiology of the circulating cholesterol and lipoproteins, biosynthesis of cholesterol, metabolism of cholesterol and other sterols in the animal organism, conversion of cholesterol to steroid hormones, microscopical localization of cholesterol in cells and tissues, pathological manifestations of abnormal cholesterol metabolism, and treatment of disorders of cholesterol metabolism, respectively. Each covers the most important developments in each subject and provides extensive references.

Other chapters deal with the evolutionary aspects of sterols, sterol requirement of insects and protozoa, microbial metabolism of steroids, and some of the relations of cholesterol to other lipids. This book, because of its extensive coverage, will have special appeal to those interested in the broader aspects of steriod metabolism and provides an exceptionally good source of cholesterol metabolism.

John C. Forbes
Medical College of Virginia

. . . the work of every pharmacist in his own community will be a testimonial of the value of his education and the dignity of his profession.
Sylvester H. Dretzka, Am. J. Pharm. Ed., 5, 447 (1941)

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Symposium on Protein Structure, Albert Neuberger. John Wiley & Sons, Inc., New York 16, New York, 1958. 351 pp., figs., tbls. $7.75.

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An Introduction to Pharmacology and Therapeutics, J. A. Gunn. Ninth Edition. Oxford University Press, New York 16, New York, 1958. ix + 327 pp. $4.25.

Epilepsy, Manfred Sakel. Philosophical Library, New York 16, New York, 1958. xxxvi + 204 pp. $5.00.

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Poisons, Properties, Chemical Identification, Symptoms and Emergency Treatment, Vincent J. Brookes and Morris B. Jacobs. Second Edition. D. Van Nostrand Company, Inc., Princeton, New Jersey, 1958. xvi + 272 pp., tbls. $6.50.

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Chemical Concepts of Psychosis, Max Rinkel and Herman C. B. Denber. McDowell, Obolensky, Inc., New York, New York, 1958. xxi + 485 pp., figs,. tbls. $7.50.

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